FAQ • 07/2015

Connecting a PC Station to an S7-1200 using OPC

TIA Portal

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1 Introduction

This entry shows you how to configure an S7-1200, a PC station and an S7 connection in the TIA Portal so that you can exchange data between the stations over Industrial Ethernet.

Note In the TIA Portal you need STEP 7 Professional, because with STEP 7 Basic you cannot configure a PC station, but only the SIMATIC S7-1200.

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2 Procedure for S7-1200 up to firmware V3

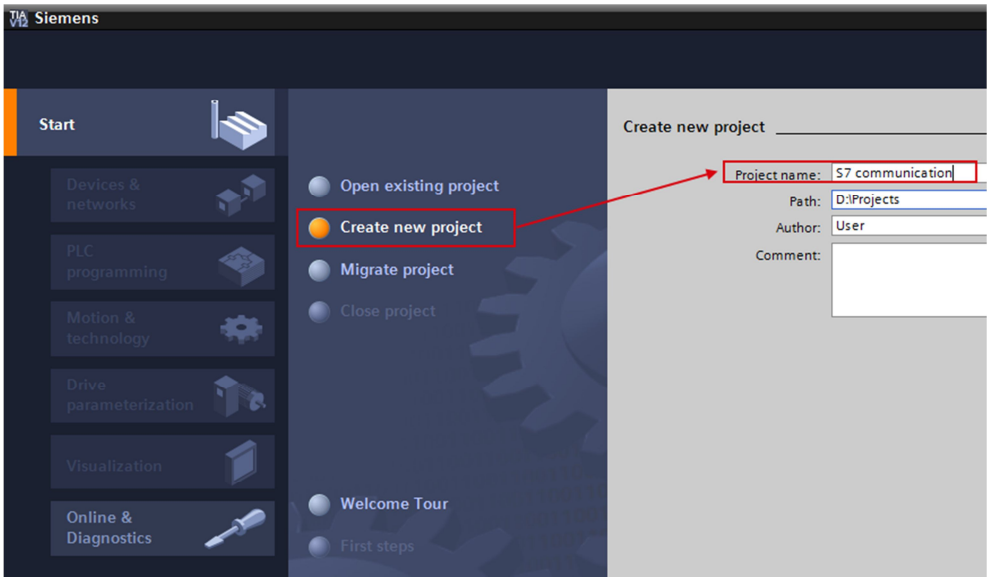
This chapter shows:

- How you configure an SIMATIC S7-1200 and a PC station in TIA Portal
- How you project an S7 connection for data exchange between SIMATIC S7-1200 and PC station

Creating a Project

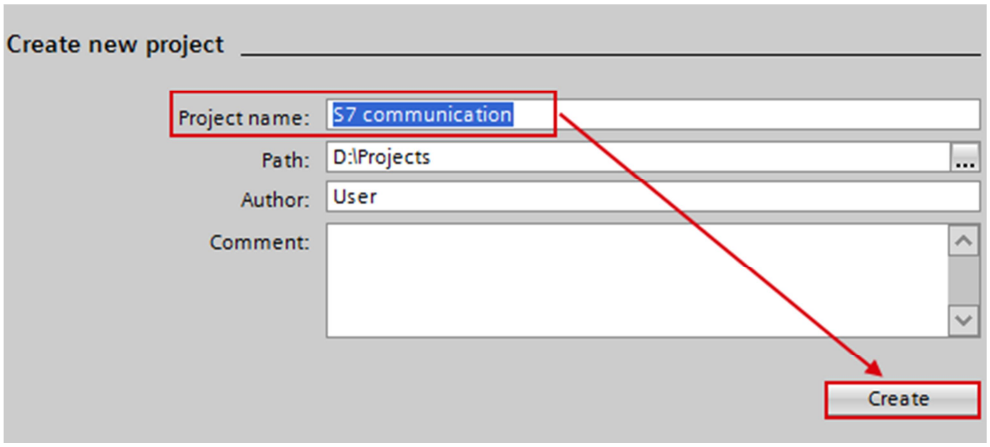
- In Windows, select the command "Start > All Programs > Siemens Automation > TIA Portal V12" to start the TIA Portal.
- In the Portal view, select the "Create new project" action.
- Enter the project name in the appropriate field.

Figure 2-1



Click the "Create" button to create a new project.

Figure 2-2



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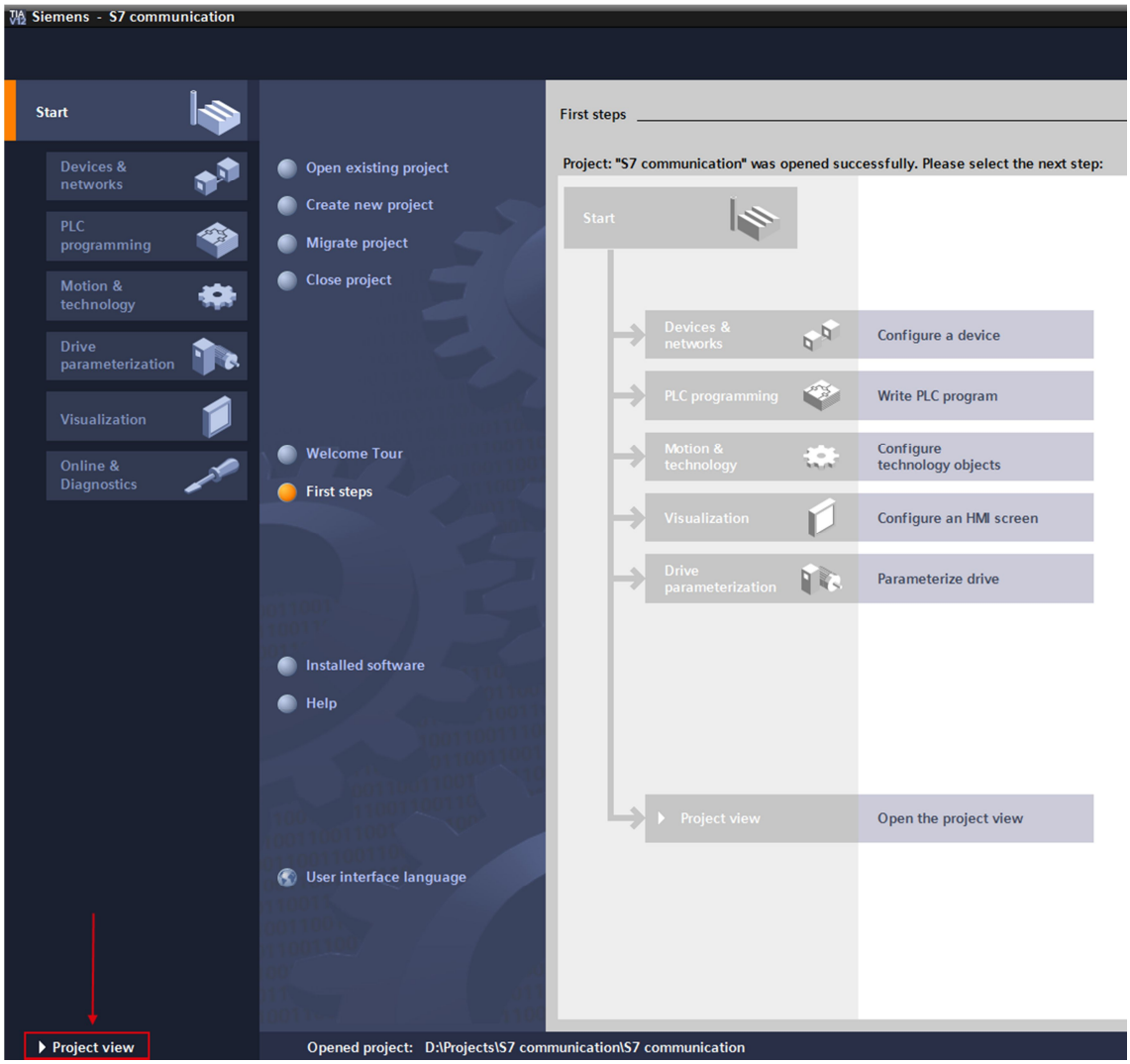
Switch to Project View

Use the "Project View" link to switch to the Project View.

Figure 2-3



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2.1 Configuration of the S7-1200

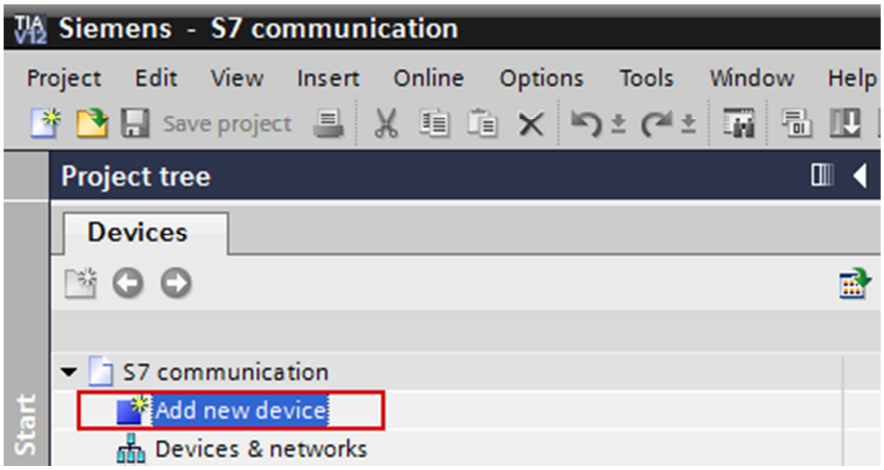
You configure your S7-1200 station in the TIA Portal. Then you create the user program and define which data is to be monitored over the S7 connection of the OPC server.

2.1.1 Configuring the Hardware

Add an S7-1200 Station

In the project tree, double-click the "Add new device" item. The "Add new device" dialog opens.

Figure 2-4



Click the "Controllers" button in the working area. Go to "Controllers > SIMATIC S7-1200 > CPU" and select the required controller. Click the "OK" button to add the selected S7-1200 CPU to your project.

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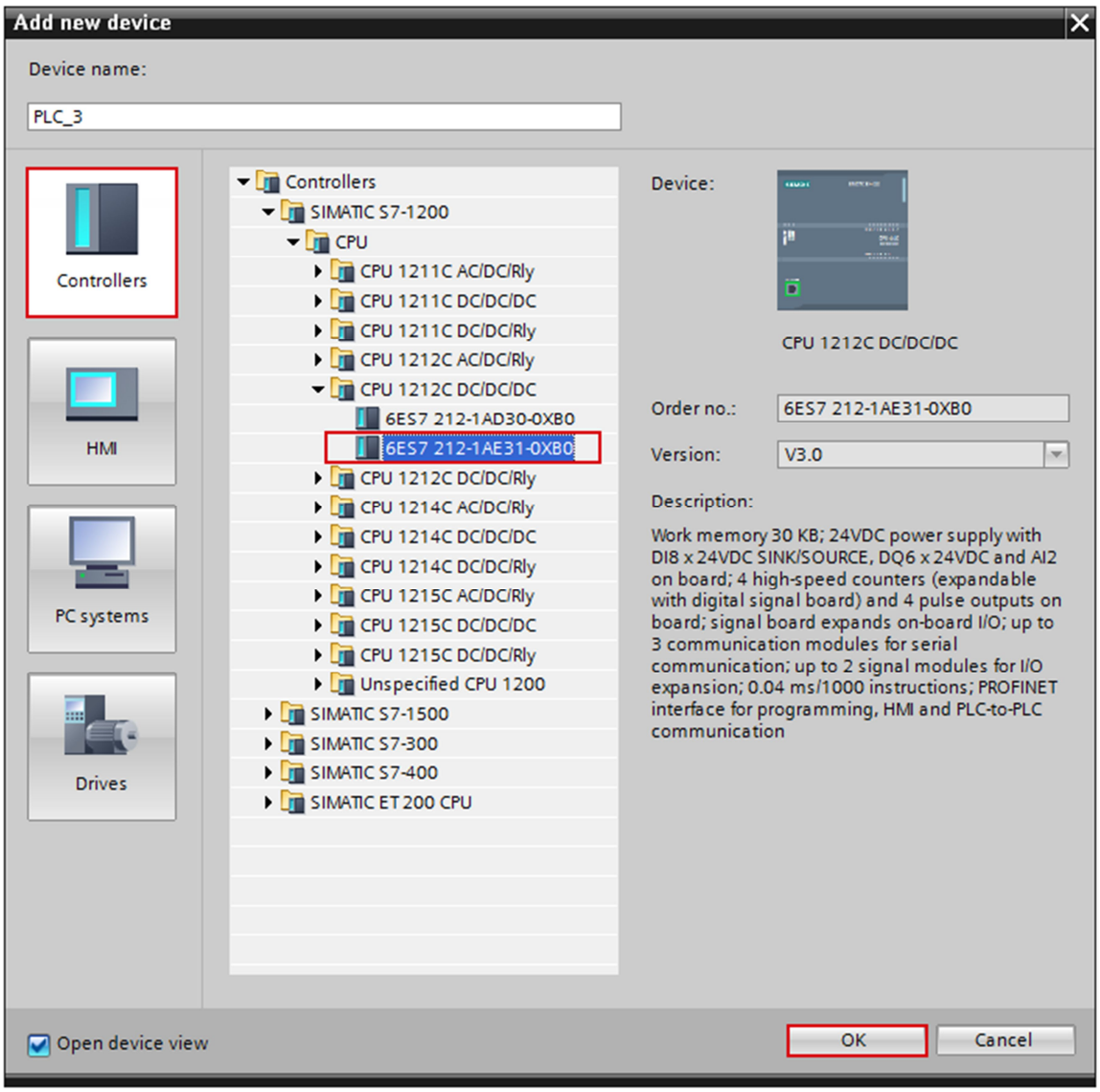
Figure 2-5



Define IP address and assign subnet

In the project tree, double-click the "Devices & networks" item. The devices and networks editor opens.

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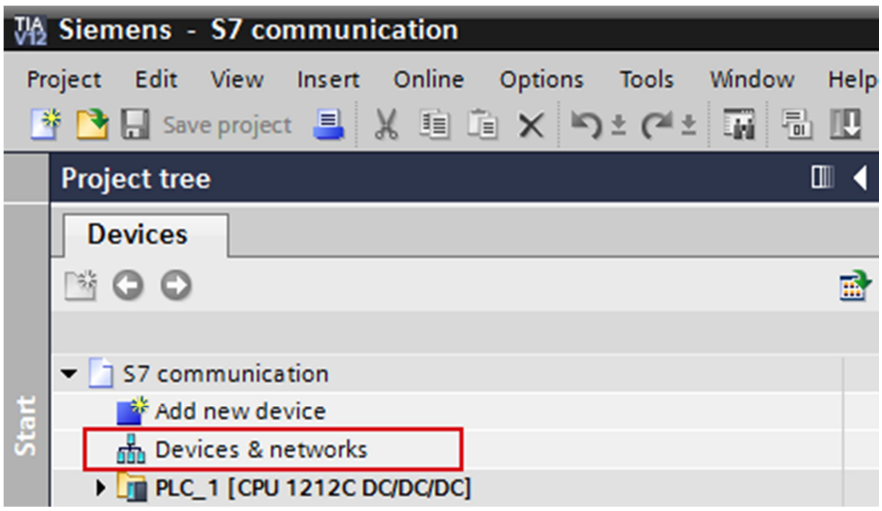
Figure 2-6

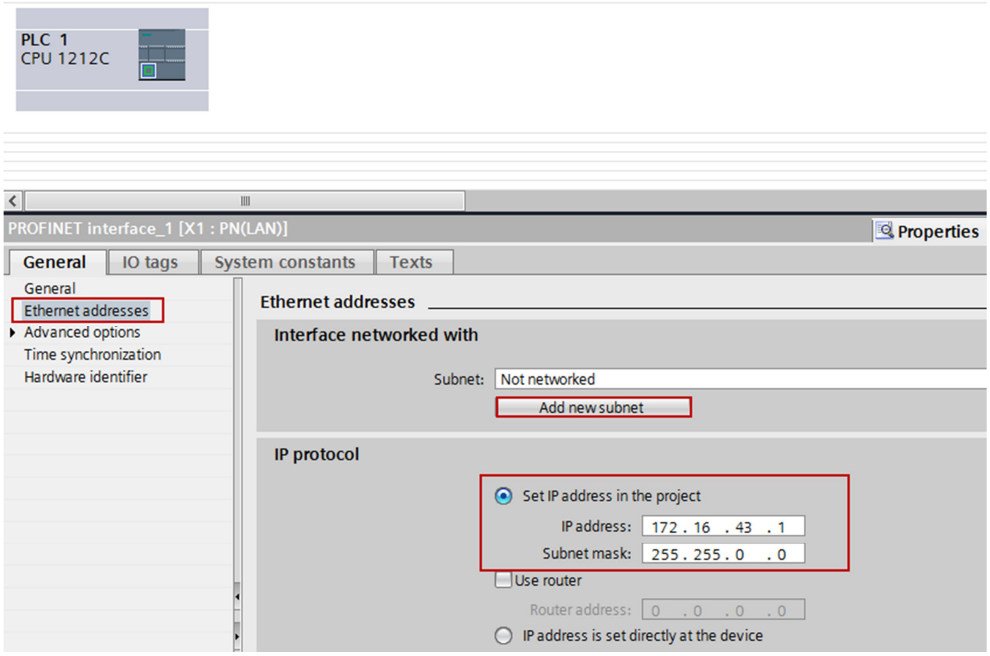


In the Network View or Device View of the devices and networks editor you click the PROFINET interface of the S7-1200 CPU.

In the inspector window you switch to the "Properties" tab. Select the "Ethernet addresses" item in the area navigation.
In this example you enter the IP address 172.16.43.1 and the subnet mask 255.255.0.0 for the PROFINET interface of the S7-1200 CPU.

Then assign a subnet to the PROFINET interface. Click the "Add new subnet" button to insert a new subnet.

Figure 2-7



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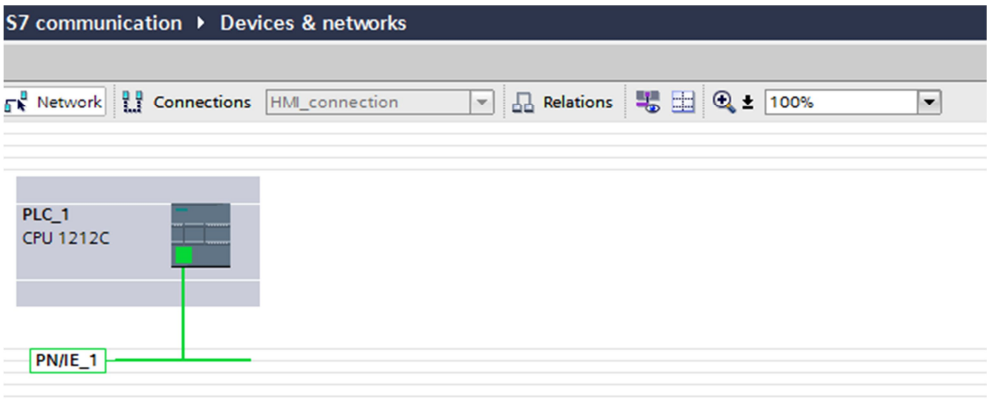
The connection between the subnet, PN/IE_1, for example, and the S7-1200 is now displayed in the "Network View" of the devices and networks editor.

Figure 2-8



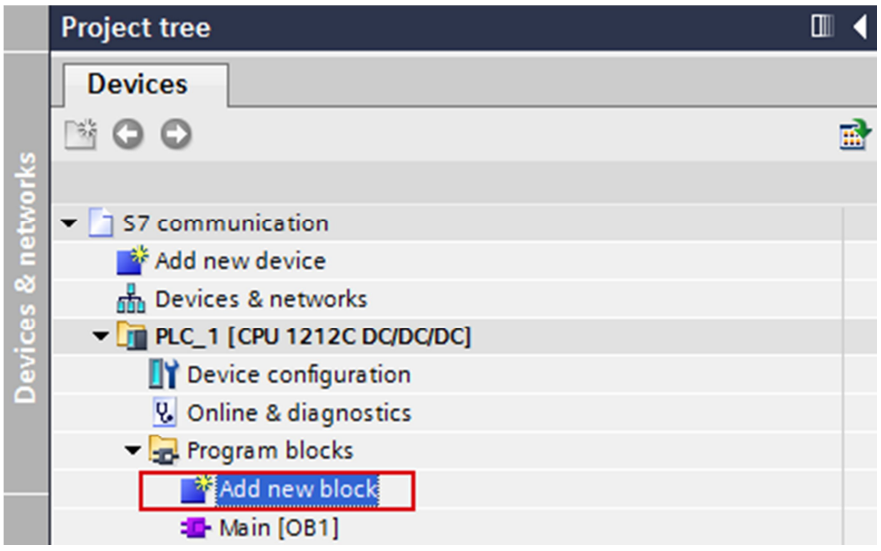
2.1.2 Creating a User Program

Add a data block

In the project tree, navigate to the device folder of the S7-1200 CPU, "PLC_1 [CPU 1212C …]", for example. The device folder contains structured objects and actions that belong to the device.

In the device folder you navigate to the "Program blocks" subfolder and double-click the "Add new block" action. The "Add new block" dialog opens.

Figure 2-9



Click the "DB Data block" button. Enter the name of the data block and enable the "Manual" option to assign the number of the data block manually. If you enable the "Automatic" option, the number of the data block is assigned automatically.

Apply the settings with "OK".

The data block DB1 "Data block 1" is used in this example.

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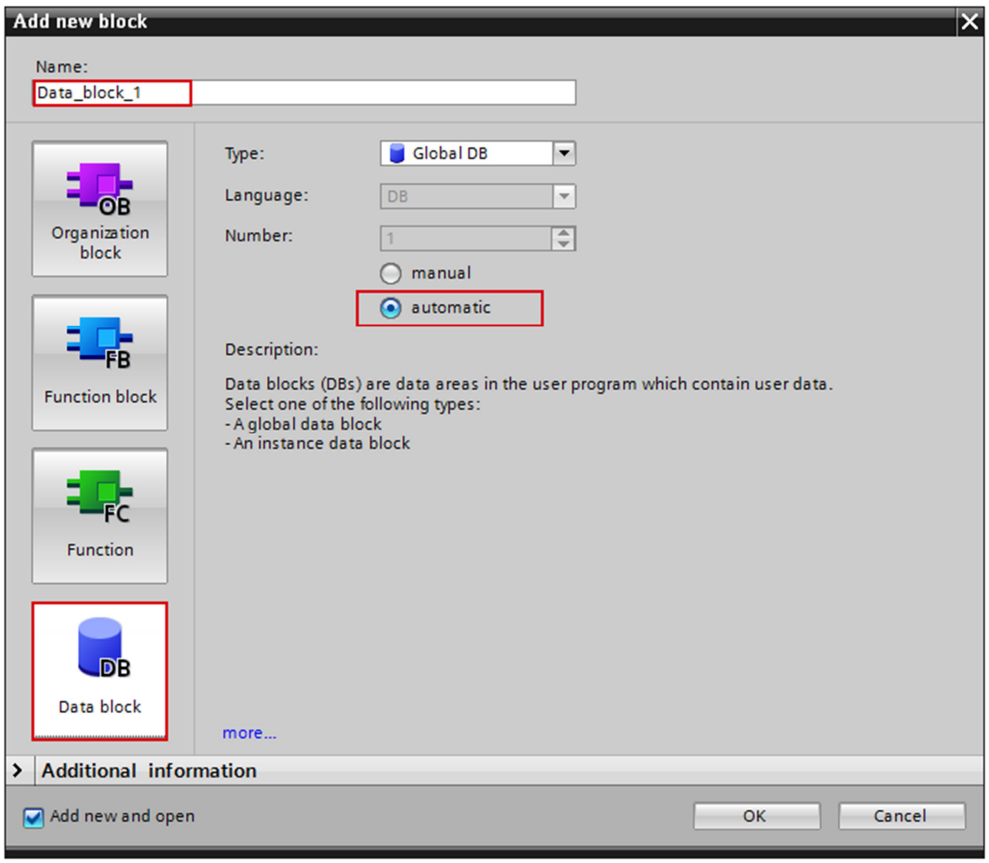
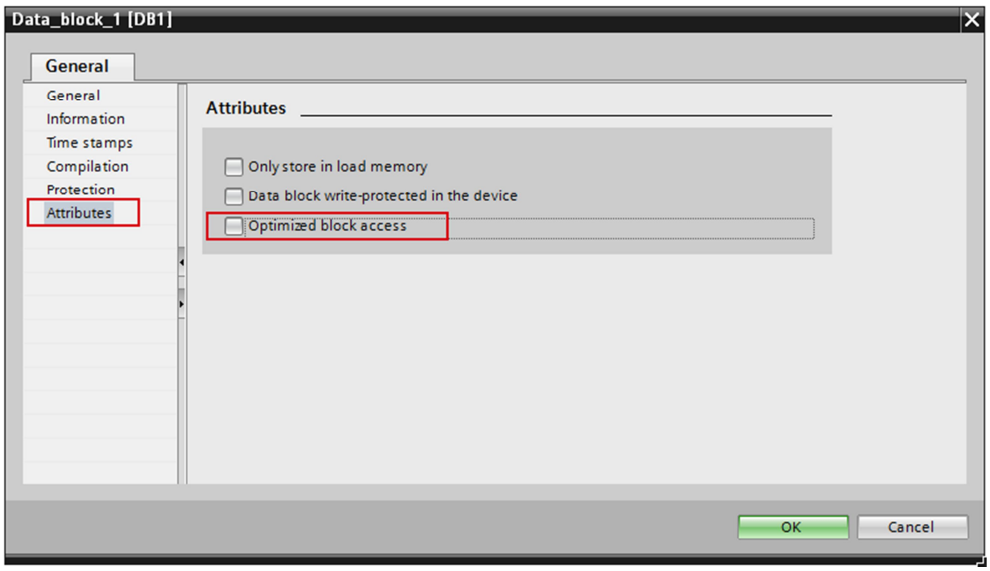
Figure 2-10



In the Properties of the data block you go to "Attributes" and disable the "Optimized block access" option.
Data blocks with standard access have a fixed structure. The data elements in the declaration include both symbolic names and a fixed address in the block. The address is displayed in the "Offset" column. You can address the tags in this block both symbolically and absolutely.

Figure 2-11



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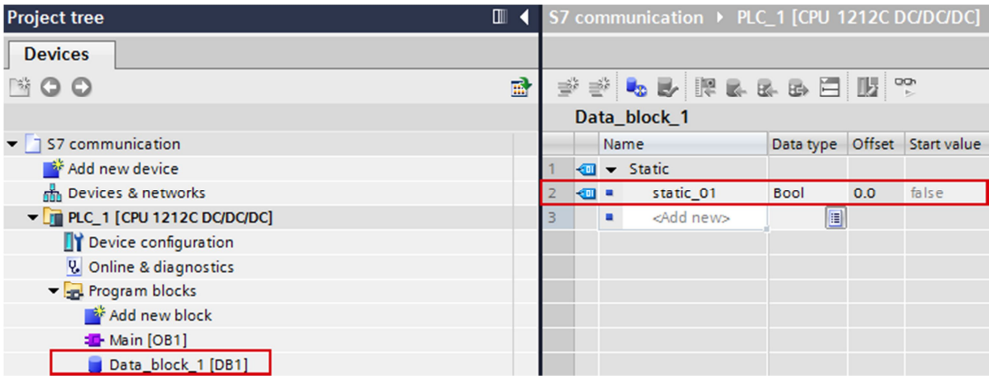
Define static tag in the data block

Define the static tag "static_01" of the "Bool" data type in the DB1 "Data block 1".

Click the "Compile" button.

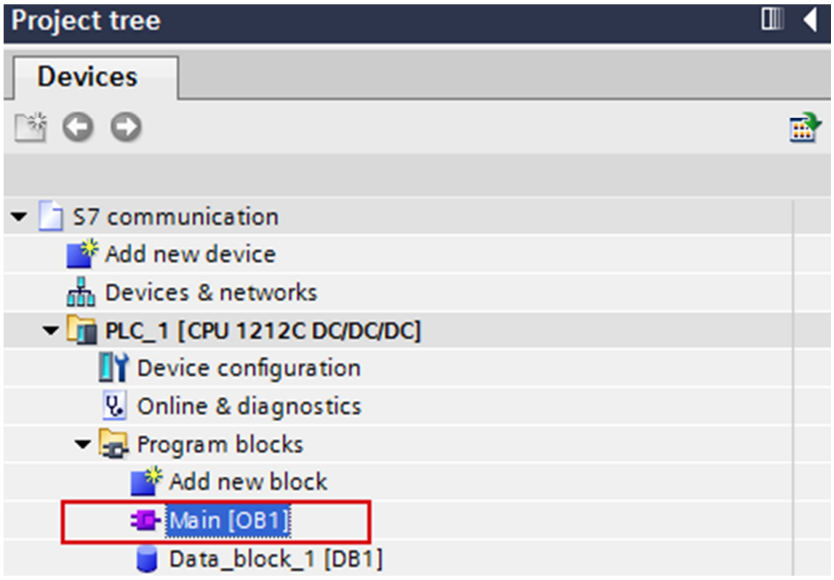
Figure 2-12



Create Main [OB1]

In the "Program blocks" folder, you double-click the "Main [OB1]" block to open the corresponding dialog window.

Figure 2-13



Create the program as shown in Figure 2-14. The bit links are in the "Instructions" task card under "Basic instructions > Bit links".

Use drag-and-drop to add the normally open contact, the flip-flop and the Assignment to Network 1 of the "Main [OB1]" block.

Assign the tags below to the flip-flop, to the normally open contact at inputs S and R of the flip-flop and to the assignment at output Q of the flip-flop.

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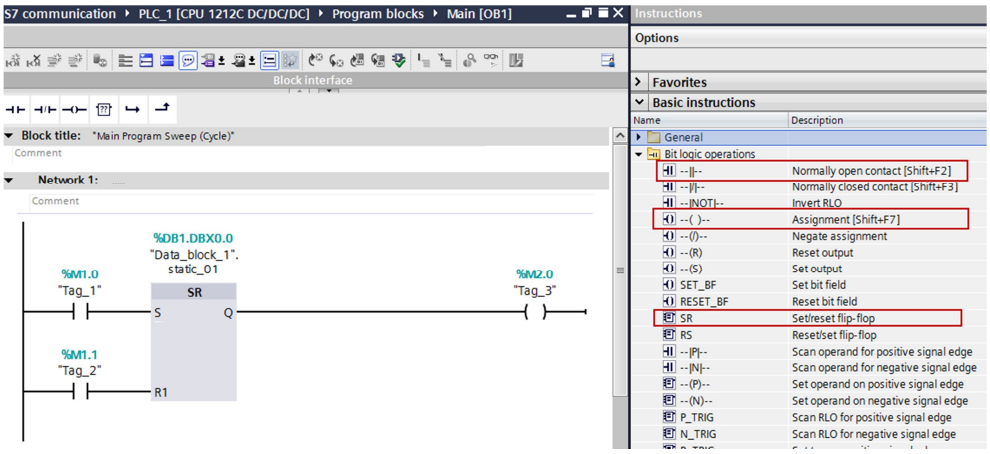
Table 2-1

Variable	Description
M1.0	SR flip-flop input S: NO contact
M1.1	SR flip-flop input R: NO contact
DB1.DBX0.0	SR variable
M2.0	SR flip-flop output Q: Assignment

Figure 2-14



Note The "%" character before the absolute address is added automatically by the TIA Portal.

Click the "Compile" button.

2.2 Configuring the PC Station

Before you start configuring the PC station in the TIA Portal, determine or change the IP address of the network card that you are using in your PC station. You enter the IP address and subnet mask of the network card when you configure the PC station in the TIA Portal.

Determine and change the IP address and subnet mask of the network card

In Windows you open the "Network and Sharing Center" and select the "Change adapter settings" functions. Open the Properties dialog of the network card to which the S7-1200 is connected.

In this example the network card receives the IP address 172-16.40.11 and subnet mask 255.255.0.0.

Note The IP address configured for the PC station in the TIA Portal must match the IP address set in Windows. If you are not using a router, the IP addresses of the PC station and the S7-1200 CPU must be in the same subnet.

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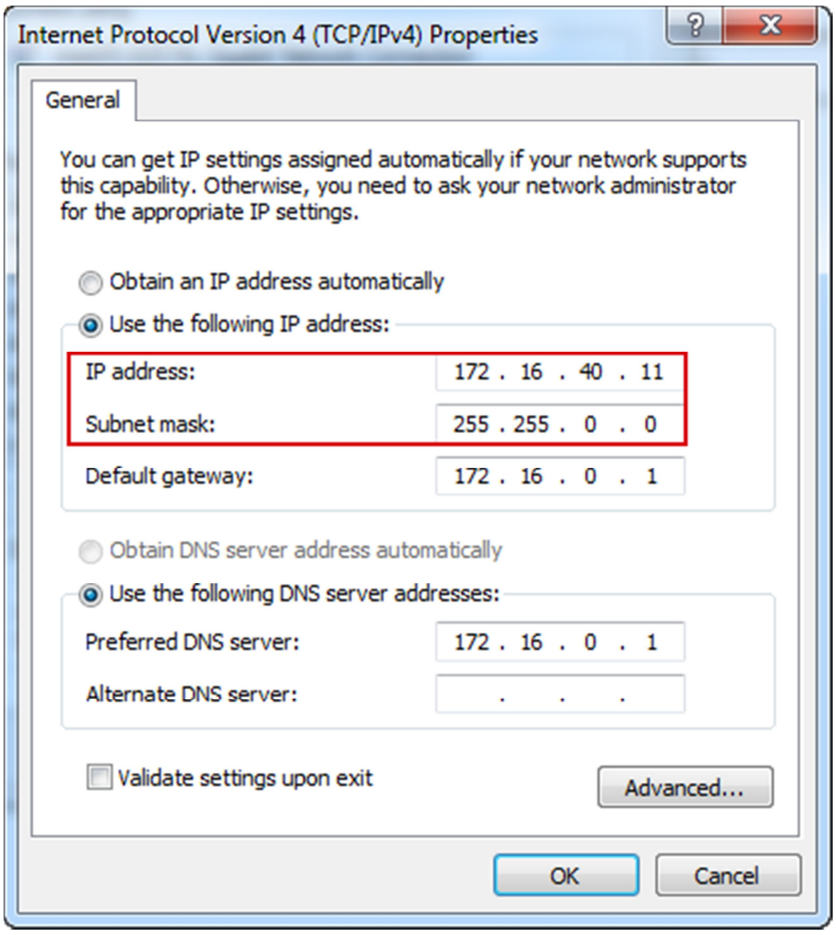
Figure 2-15



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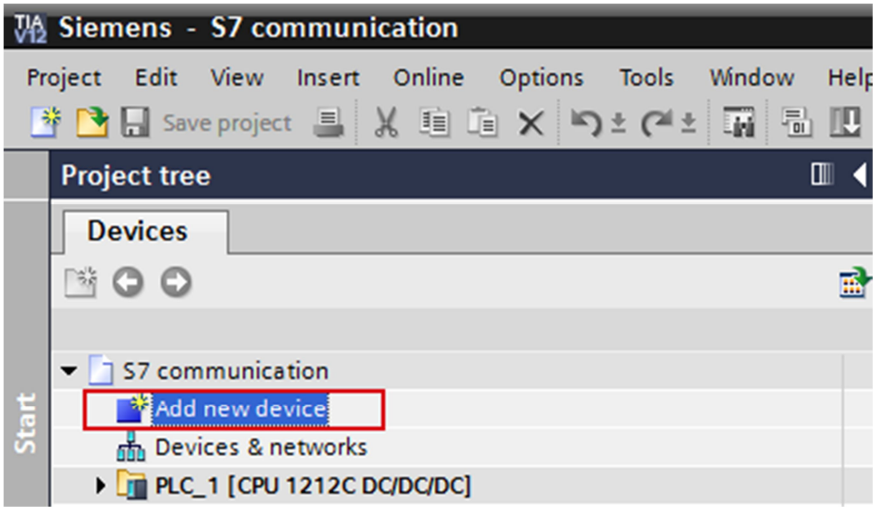
Add a PC Station

In the TIA Portal you open the project that contains the configuration for the S7-1200 station.

In the project tree, double-click the "Add new device" item. The "Add new device" dialog opens.

Figure 2-16



Click the "PC systems" button in the working area. Go to "PC systems > PC general" and select the "PC station" item.

Click the "OK" button to add a PC station named "PC Station" to your project.

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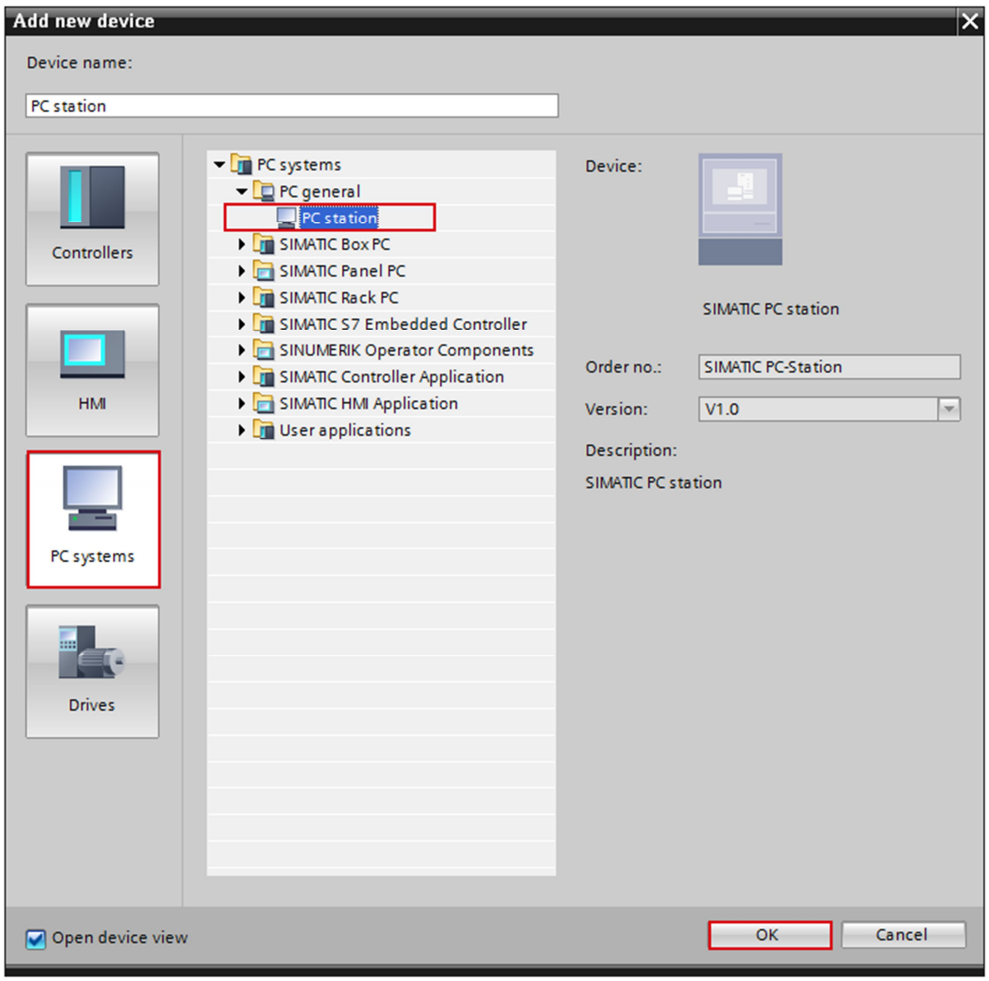
Figure 2-17



Open the "Device View" of the PC station in the devices and networks editor

In the project tree, navigate to the device folder of the PC station, "PC Station [PC station]", for example. The device folder contains structured objects and actions that belong to the device.

In the device folder double-click the "Device configuration" object to open the "Device View" of the devices and networks editor.

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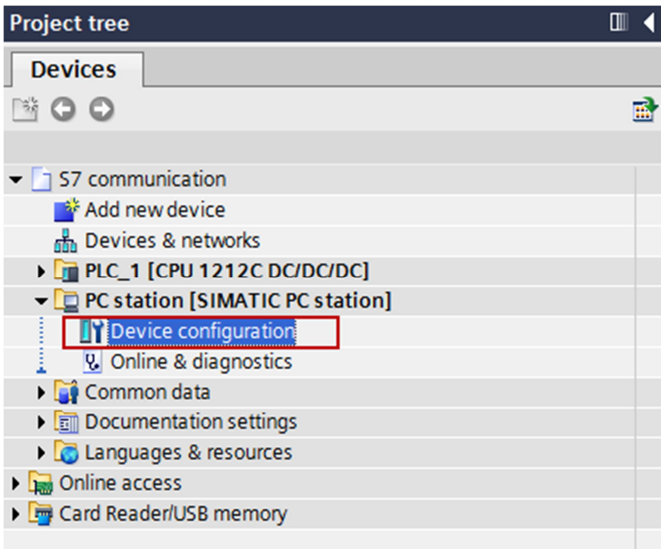
Figure 2-18

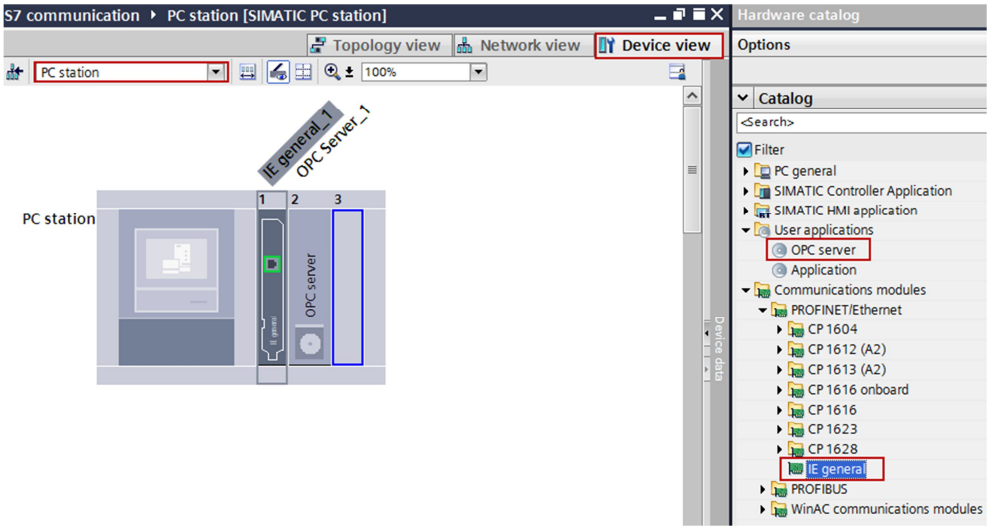


Configure user application and communication module of the PC station

In the hardware and network editor you select the Device view. Here you configure and parameterize the modules of the PC station.

The "Hardware catalog" task card contains the user applications and communication modules that you can configure in the PC station. Using drag-and-drop you add the "IE General" communication module to Slot 1 and the "OPC server" user application to Slot 2 of the PC station.

Figure 2-19



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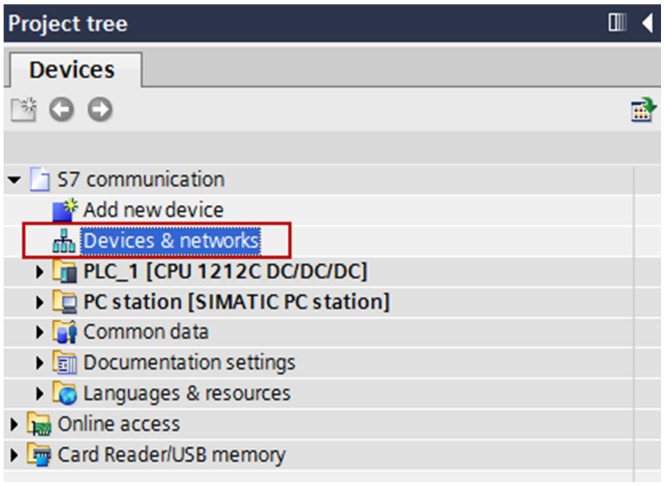
Define IP address and assign subnet

In the project tree, double-click the "Devices & networks" item. The devices and networks editor opens.

Figure 2-20



In the Network View or Device View of the Devices and Networks editor you click the PROFINET interface of the network card in the PC station.

In the inspector window you switch to the "Properties" tab. In the area navigation select the "Ethernet addresses" item.

In this example you enter the IP address 172.16.40.11 and subnet mask 255.255.0.0 for the network card.

Select the subnet that you have already assigned to the S7-1200 CPU and assign it also to the network card of the PC station.

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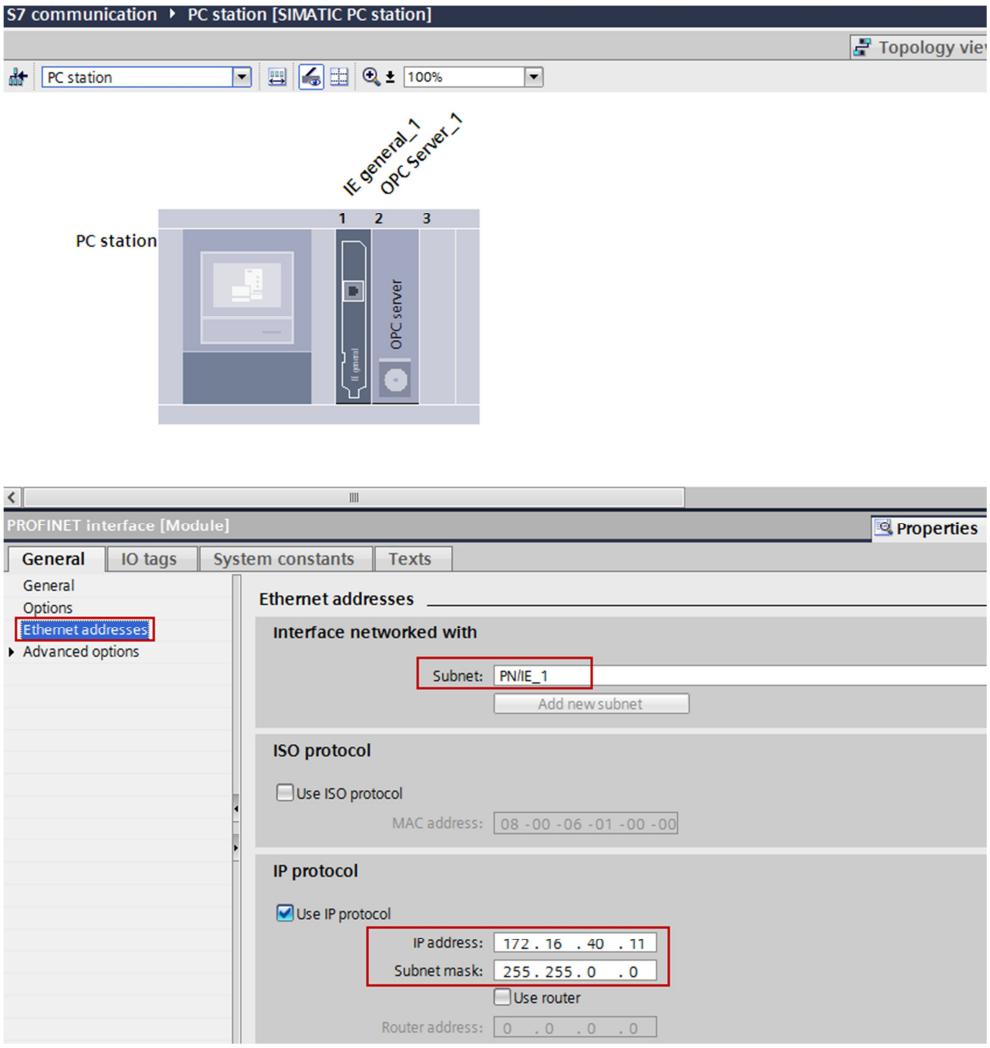
Figure 2-21



Note The IP address configured for the PC station in the TIA Portal must match the IP address set in Windows. If you are not using a router, the IP addresses of the PC station and the S7-1200 CPU must be in the same subnet.

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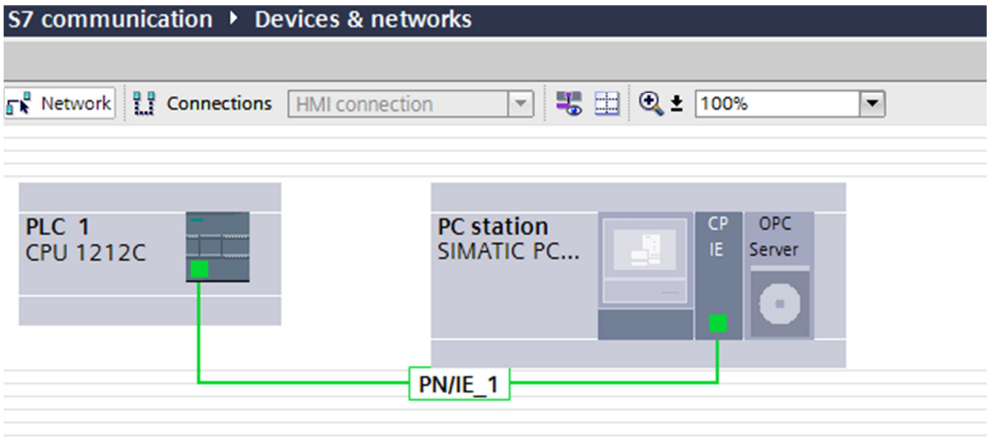
The connection between the subnet, PN/IE_1, for example, and the S7-1200 and the PC station is now displayed in the "Network View" of the Devices and Networks editor.

Figure 2-22



2.3 Configuring the S7 Connection

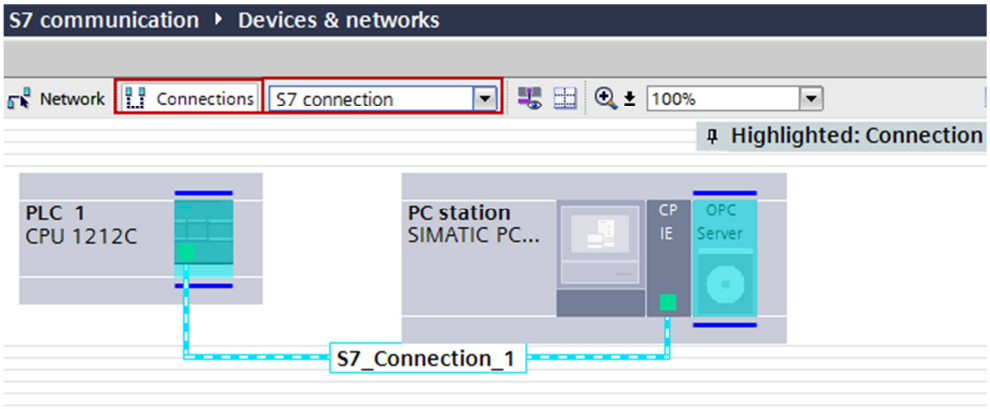
2.3.1 Adding the S7 Connection

In the project tree, double-click the "Devices & networks" item. The devices and networks editor opens. Switch to the Network view.

In the toolbar of the Network View, click the "Connections" icon to switch to the mode for setting the connections.

In the drop-down list box you select "S7 connection" as connection type.

Figure 2-23



In the graphical area of the Network View, click the OPC server in the PC station and connect it to the S7-1200 CPU.

In the Network View, the S7 connection is displayed in the graphical area and in the "Connections" table in the table area.

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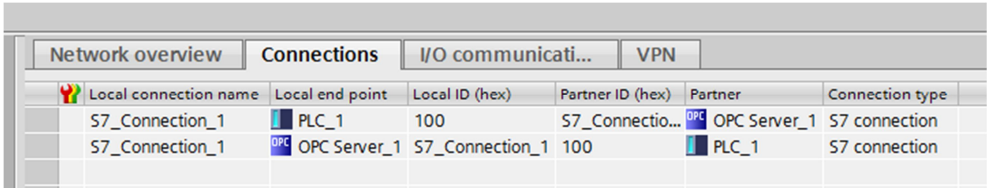
Figure 2-24



2.3.2 Displaying and Changing Properties of the S7 Connection in the Inspector Window

Proceed as described below to have the properties of the S7 connection displayed in the inspector window.

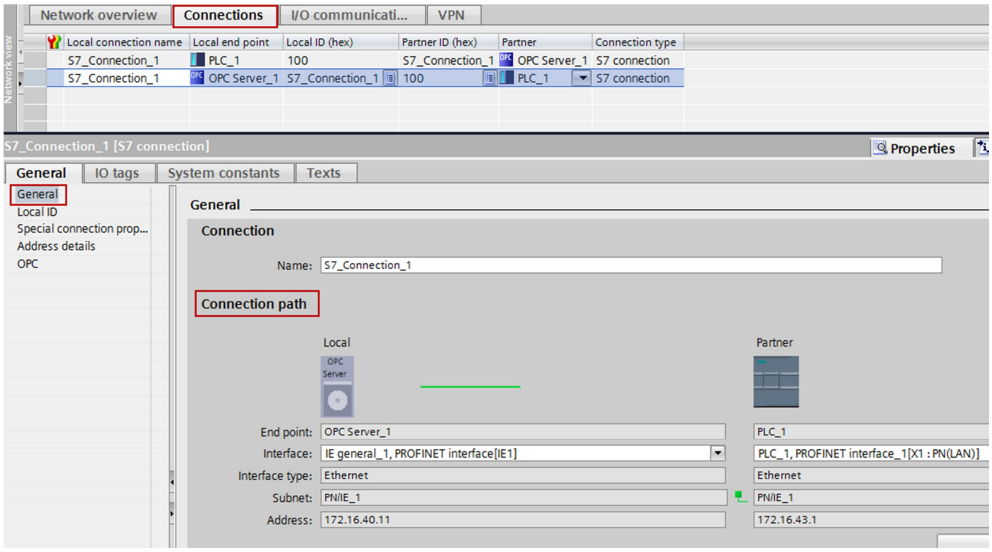
- In the table area switch to the "Connections" table and select the configured S7 connection.
- In the inspector window you switch to the "Properties" tab.

General properties

In the area navigation select the "General" item to display the connection path.

The S7 connection is between the OPC server and the S7-1200 CPU.

Figure 2-25



In the area navigation select the "Special connection properties" item.

Here you see a display of the special connection properties of the local end point, "Active connection establishment", for example.

In this example, the OPC server establishes the S7 connection. The communication partner, S7-1200 CPU, is participates passively in establishing the connection.

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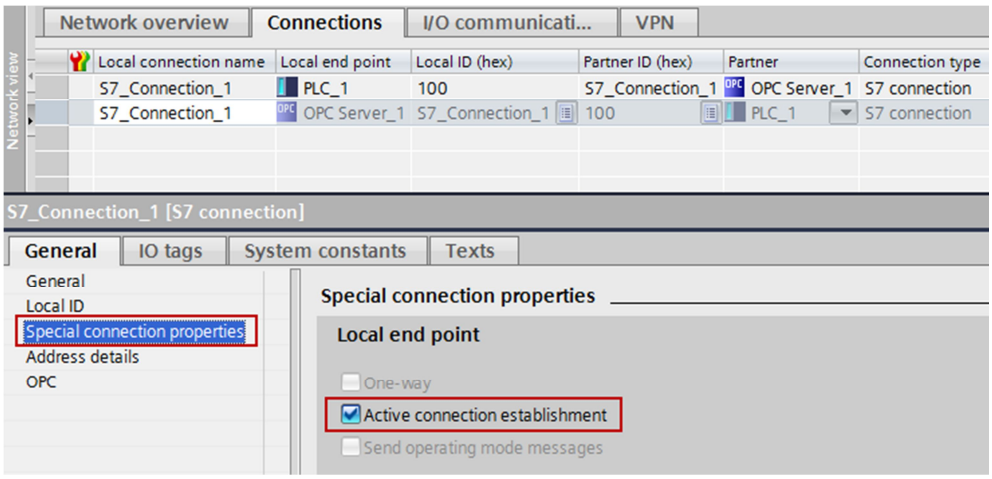
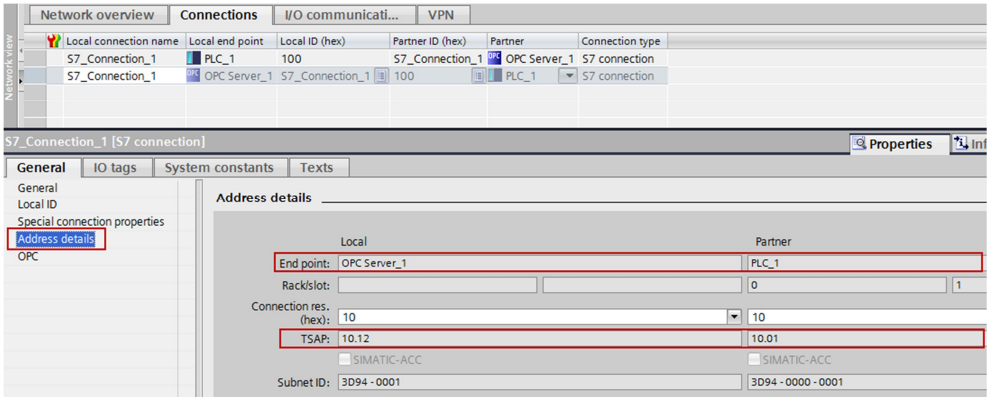
Figure 2-26



In the area navigation select the "Address details" item.
Here you have a display of the local end point, the partner end point and the TSAP of both end points.

Figure 2-27



2.4 Compiling and Downloading the Configuration and User Program of the S7-1200

Compile

In the project navigation you mark the device folder of the S7-1200 CPU. Click the "Compile" button in the toolbar. The hardware configuration and the software of the S7-1200 are compiled.

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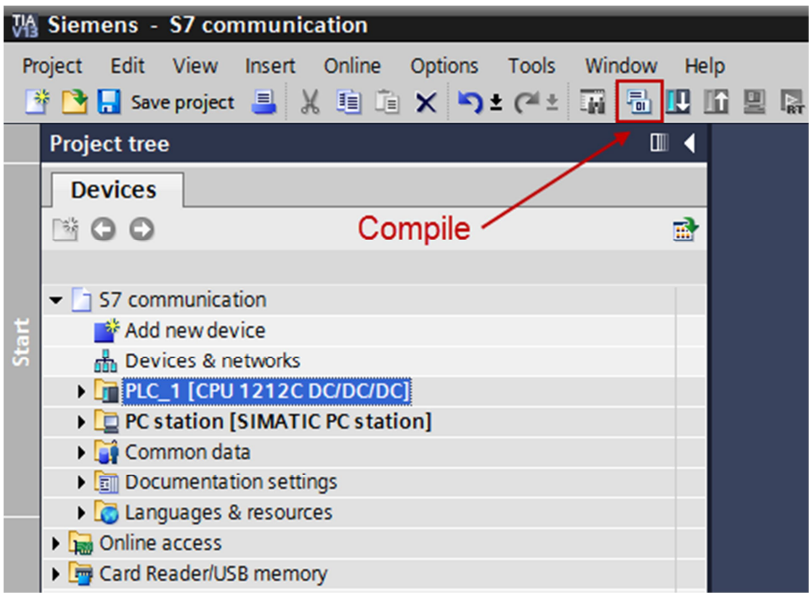
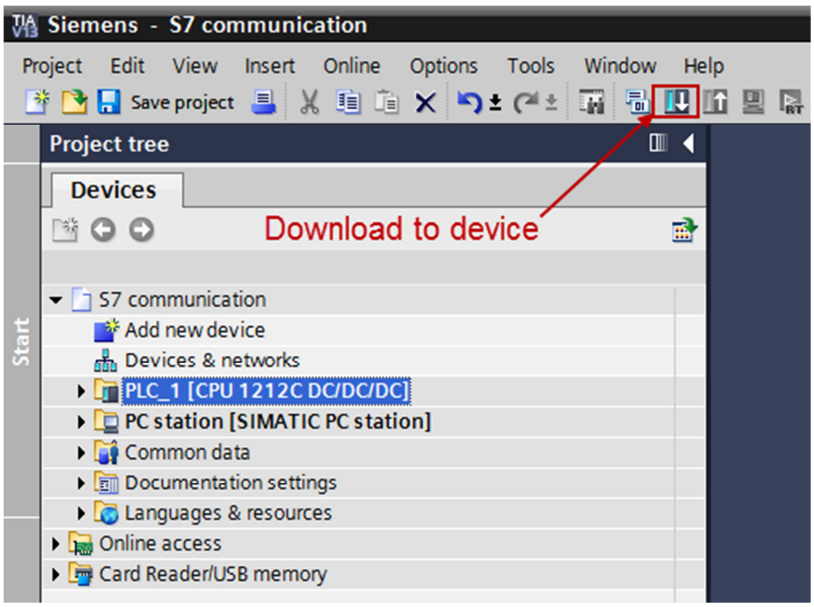
Figure 2-28



Download

In the project navigation you mark the device folder of the S7-1200 CPU. Click the "Download to device" button in the toolbar. The hardware configuration and the software are downloaded to the S7-1200 CPU.

Figure 2-29



The "Extended download to device" dialog opens. Check the settings below:

- PG/PC interface type
- PG/PC interface
- Connection with the subnet

Under "Compatible devices in target subnet" you select the relevant device and click the "Load" button.

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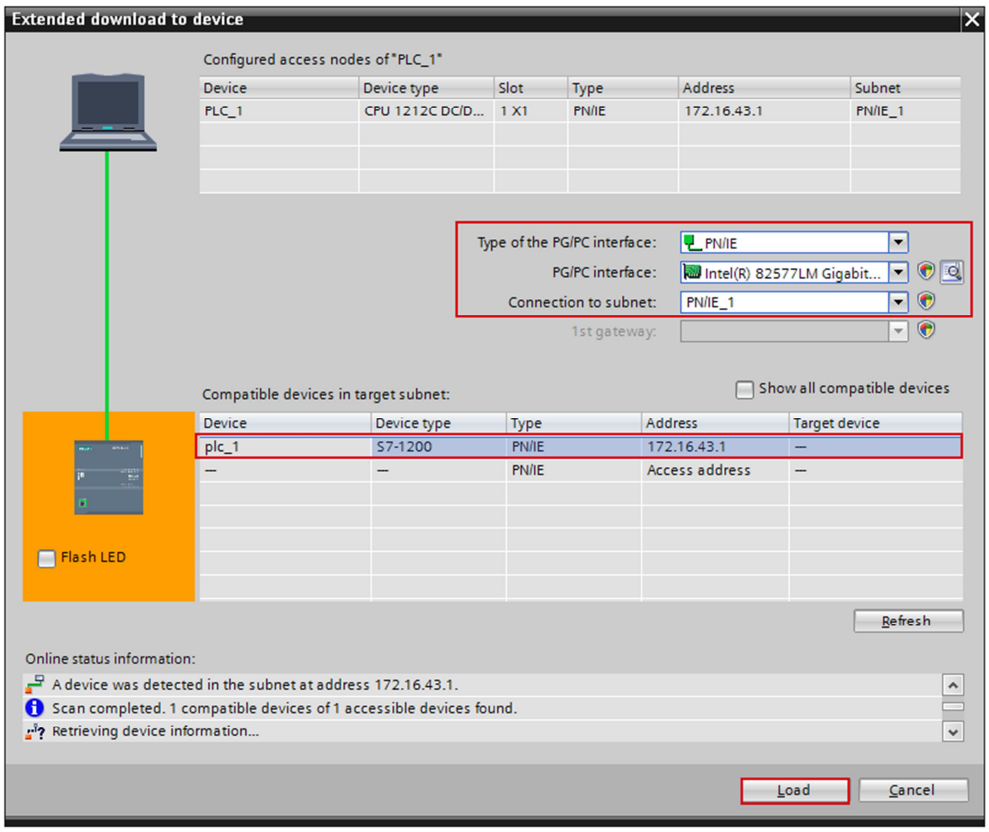
Figure 2-30



Note If the project has already been loaded once into the S7-1200 CPU, the "Load preview" dialog is opened immediately instead of the "Extended download to device" dialog.

The "Load preview" dialog opens.

- Select the "Stop all" action to stop the modules for loading into the device.
- The device configuration is downloaded into the target device (S7-1200 CPU).
- The software is downloaded consistently into the target device (S7-1200 CPU).

Click the "Load" button.

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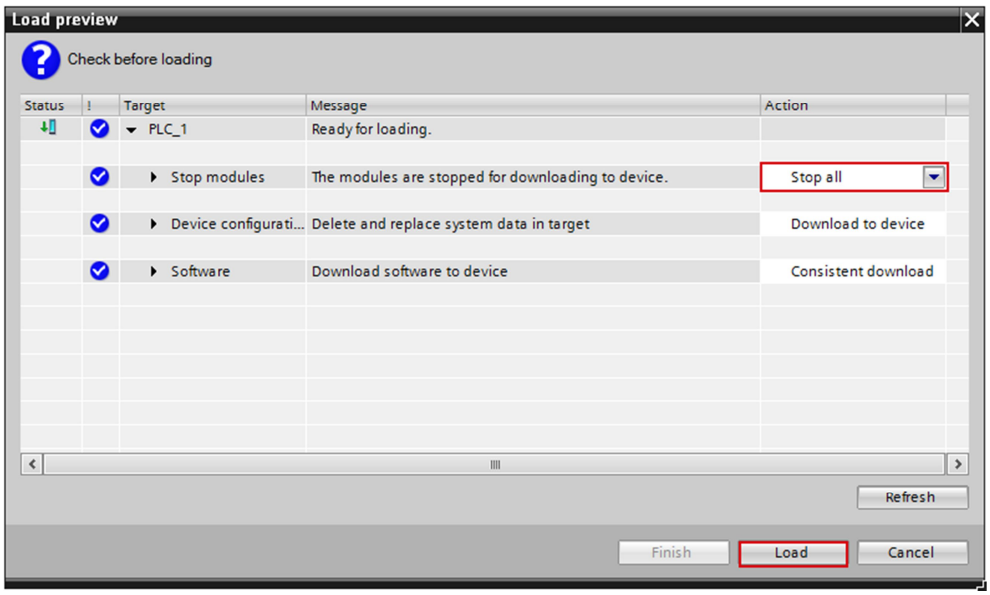
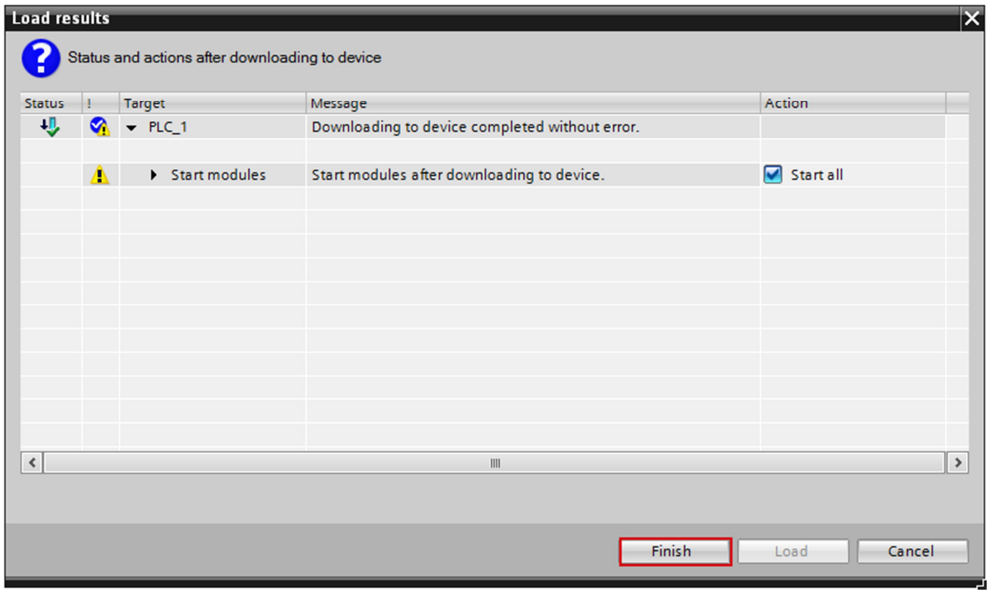
Figure 2-31



The dialog box containing the results of the download procedure opens. If the S7-1200 is in "STOP" mode for the download procedure, check the "Start all" check box. Click the "Finish" button. The status LED of the S7-1200 CPU indicates the "RUN" mode after downloading.

Figure 2-32



2.5 Compiling and Downloading the PC Station Configuration

Open the Station Configuration Editor

Open the Station Configuration Editor with the icon in the Windows taskbar.

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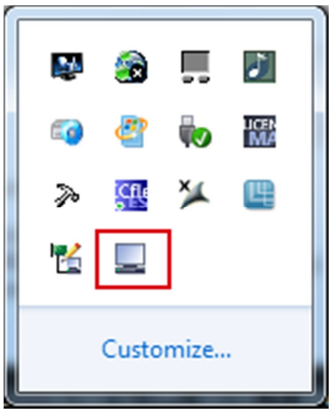
Figure 2-33



Insert the modules, namely the OPC server and the network card, in the Station Configuration Editor in accordance with the hardware configuration.

In this example you add the network card to Slot 1 and the OPC server to Slot 2.

Then change the station name in the Station Configuration Editor. The name of the PC station must be identical in the TIA Portal and in the Station Configuration Editor.

The station name "PC station" is used in this example.

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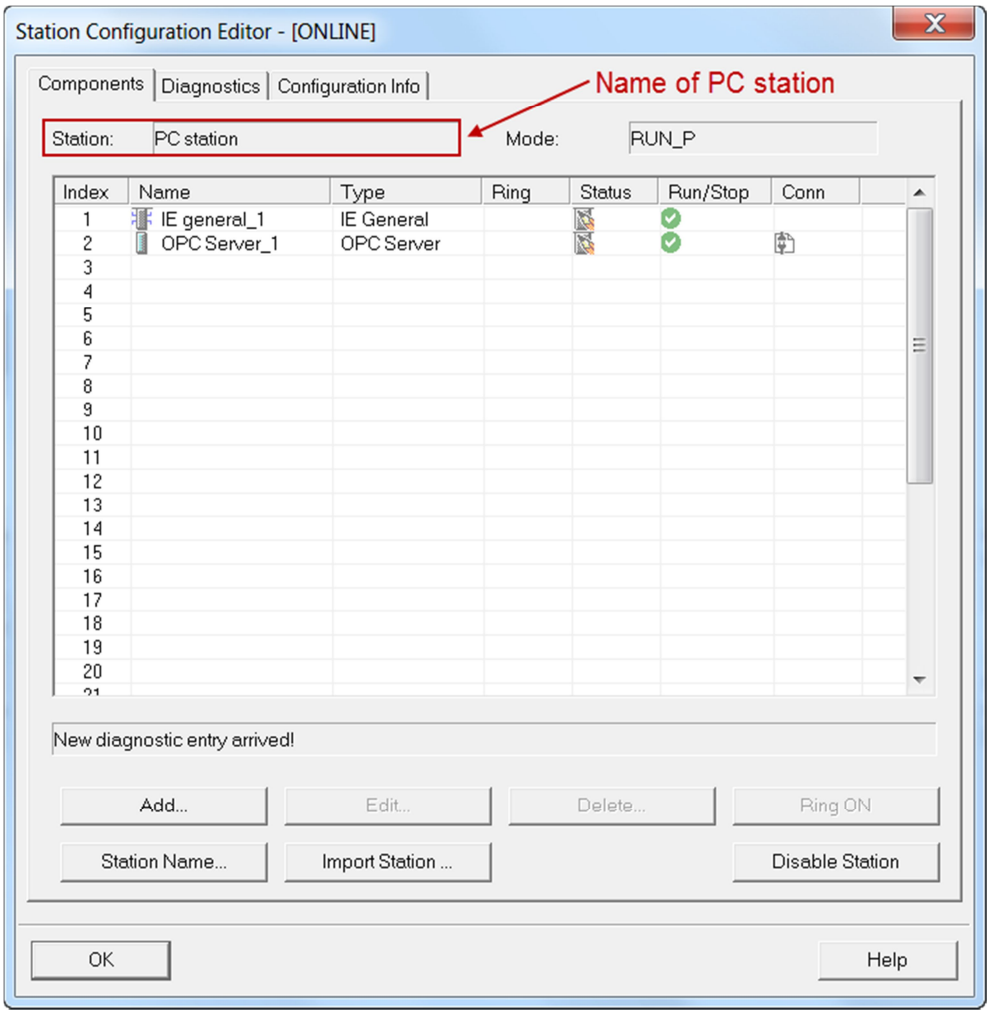
Figure 2-34



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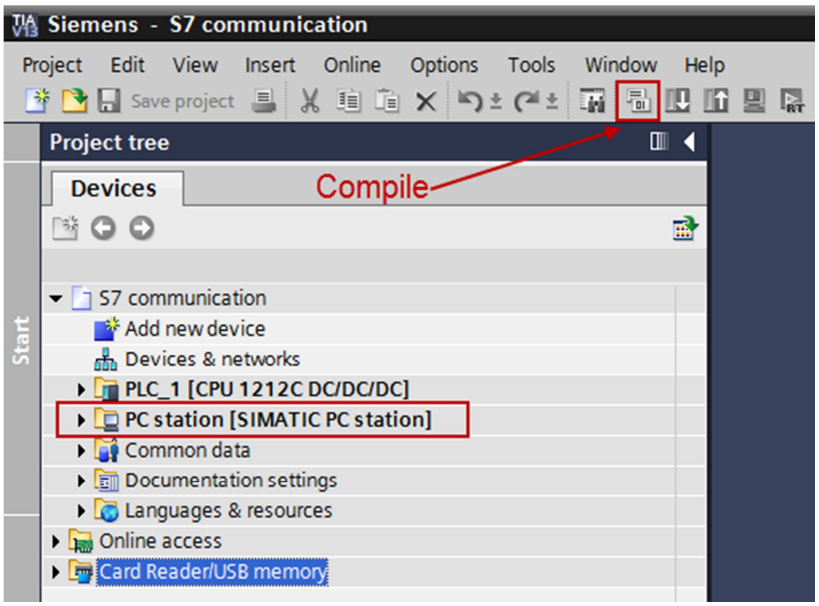
Compile

In the project navigation you mark the device folder of the PC station. Click the "Compile" button in the toolbar. The hardware configuration and the software of the PC station are compiled.

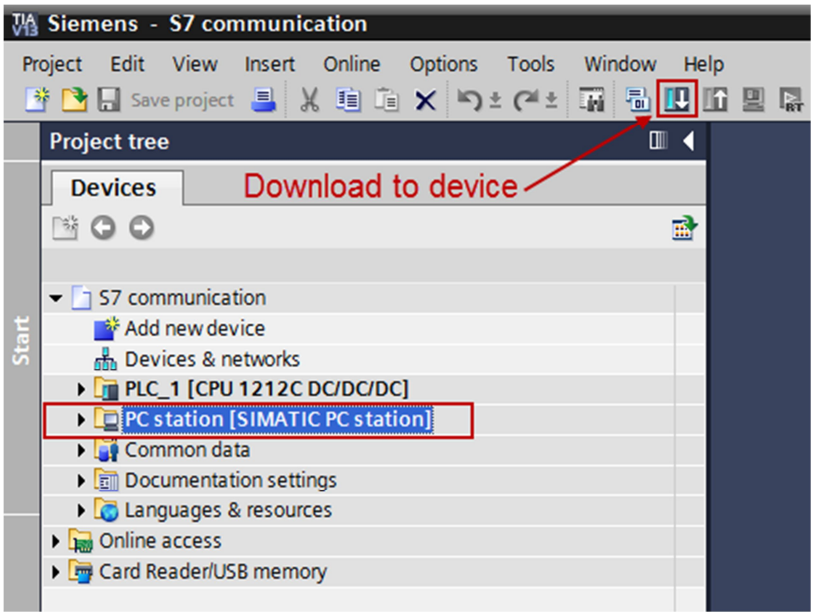
Figure 2-35



Download

In the project navigation you mark the device folder of the PC station. Click the "Download to device" button in the toolbar. The hardware configuration and the software are downloaded to the Station Configuration Editor.

Figure 2-36



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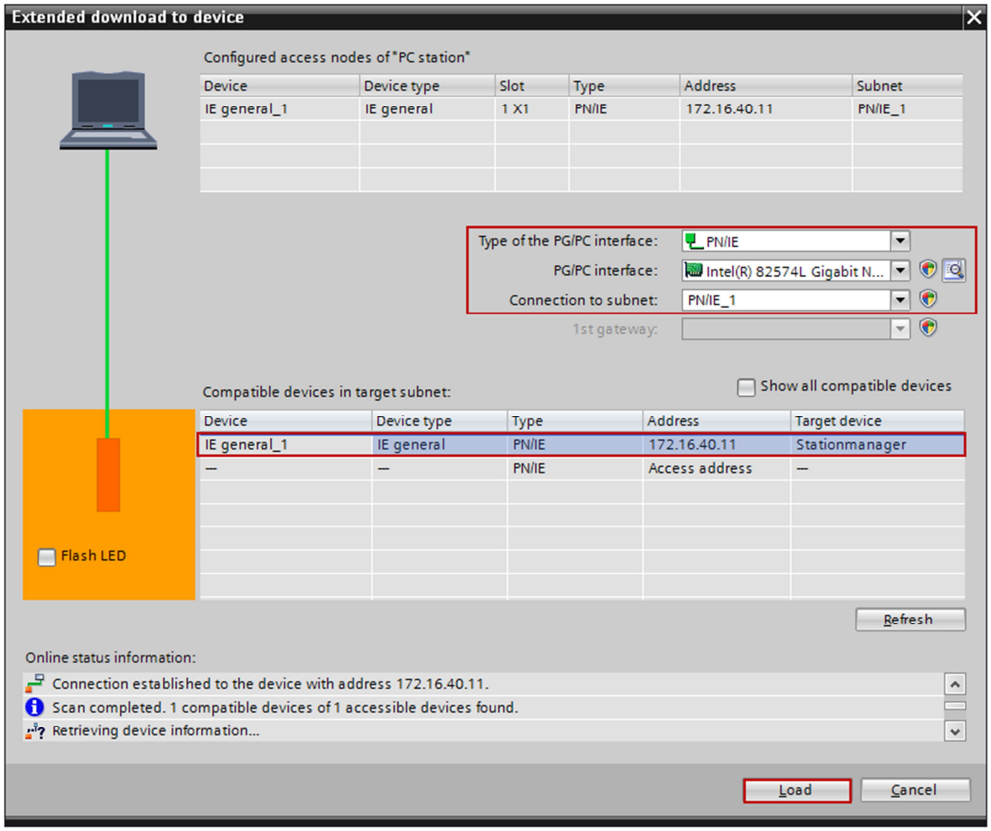
The "Extended download to device" dialog opens. Check the settings below:

- PG/PC interface type
- PG/PC interface
- Connection with the subnet

Under "Compatible devices in target subnet" you select the relevant device and click the "Load" button.

Figure 2-37



Note If the project has already been loaded once into the S7-1200 CPU, the "Load preview" dialog is opened immediately instead of the "Extended download to device" dialog.

The "Load preview" dialog opens. Click the "Load" button.

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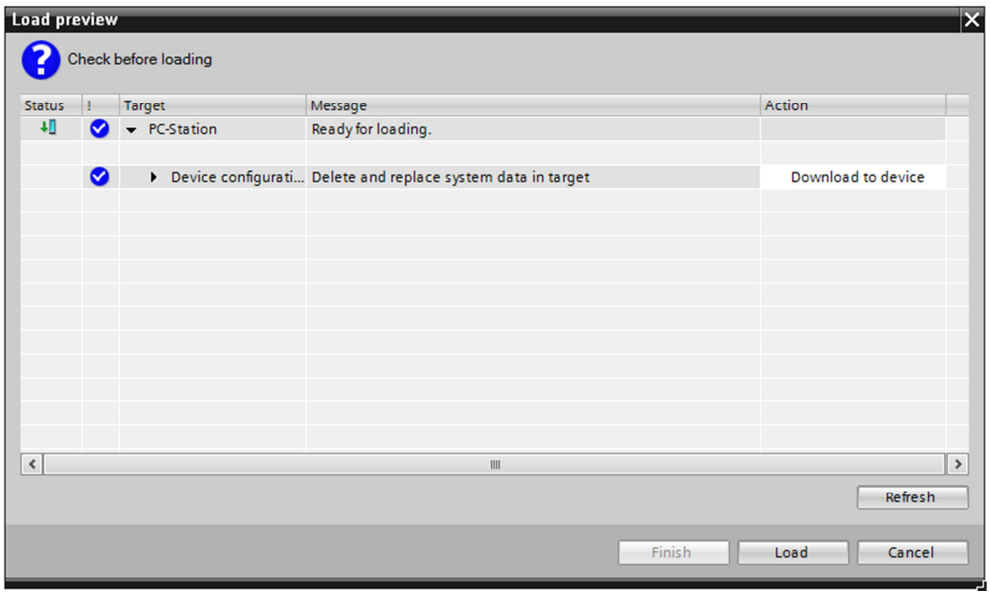
Figure 2-38



Commissioning of the PC station is completed after downloading of the configuration.

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2.6 OPC Scout V10

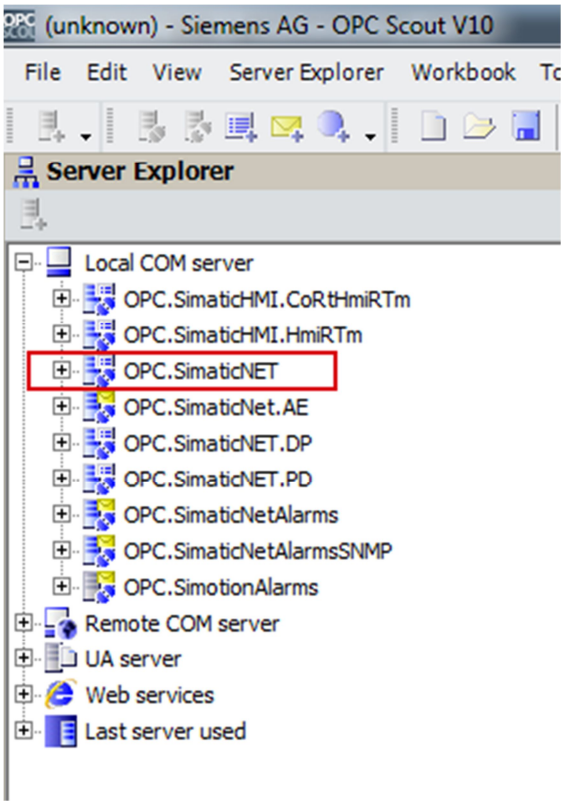
In this example the OPC Scout V10 is used as the OPC client. Using the OPC client you can access the data of the S7-1200 CPU over the OPC server.

Start the OPC Scout V10 by means of the Windows menu "Start > All Programs > Siemens Automation > SIMATIC > SIMATIC NET > OPC Scout V10".

Establish connection to the OPC server

In the Server Explorer you double-click the "OPC.SimaticNET" item to establish a connection to the OPC server.

Figure 2-39



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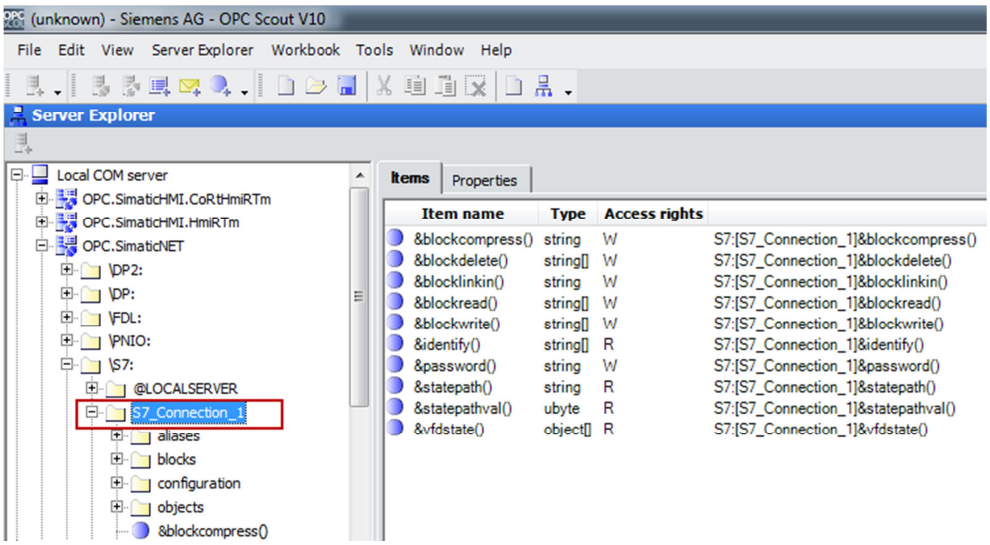
The configured S7 connection named "S7_Connection_1" is displayed in the Server Explorer under OPC.SimaticNET in the "\S7:" folder.

Figure 2-40



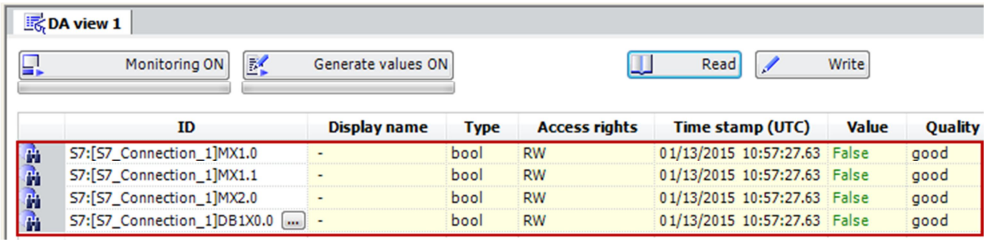
Create OPC items

Add the items below to the DA view.

Table 2-2

OPC item	Description
S7:[S7_Connection_1]MX1.0	By means of the OPC item you monitor and control the marker bit M1.0 in the S7-1200 CPU.
S7:[S7_Connection_1]MX1.1	By means of the OPC item you monitor and control the marker bit M1.1 in the S7-1200 CPU.
S7:[S7_Connection_1]MX2.0	By means of the OPC item you monitor the marker bit M2.0 in the S7-1200 CPU.
S7:[S7_Connection_1]DB1, X0.0	By means of the OPC item you monitor Bit 0.0 of the DB1 data block in the S7-1200 CPU.

Figure 2-41



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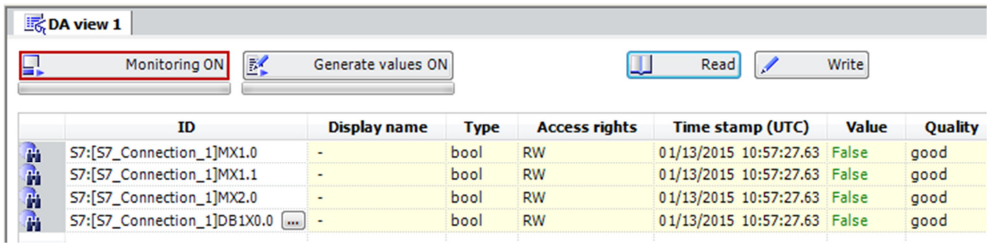
Monitor OPC items

Click the "Monitoring ON" button to monitor the values of the OPC items. The values of the OPC items are displayed in the "Value" column.

Figure 2-42



Write values

In the "New value" column you enter the value that you want to write to the S7-1200 CPU.

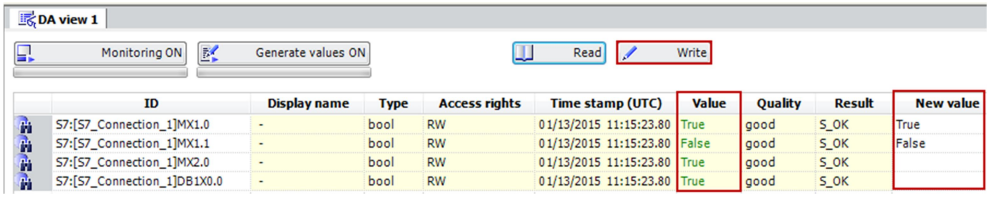
Enter the values below in the "New value" column (see Table 2-3). Click the "Write" button. The marker bit M2.0 and Bit 0 in DB1 are given the value "True".

The results of the write procedure are displayed in the "Value" column.

Table 2-3

OPC item	New value
S7:[S7_Connection_1]MX1.0	True
S7:[S7_Connection_1]MX1.1	False

Figure 2-43



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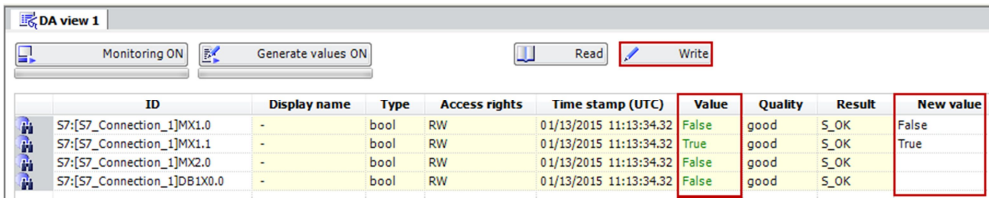
Enter the values below in the "New value" column (see Table 2-4). Click the "Write" button. The marker bit M2.0 and Bit 0 in DB1 are reset to the value "False".

The results of the write procedure are displayed in the "Value" column.

Table 2-4

OPC item	New value
S7:[S7_Connection_1]MX1.0	False
S7:[S7_Connection_1]MX1.1	True

Figure 2-44



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3 Procedure for S7-1200 V4 and Higher

This chapter shows:

- The configuration of a SIMATIC S7-1200 and a PC station in the TIA Portal
- The configuration of an S7 connection for data exchange between the SIMATIC S7-1200 and the PC station

S7 access to optimized data blocks

With firmware V4.0 and higher the S7-1200 CPU supports S7 connections with access to optimized data blocks.

The OPC Server V12 and higher supports communication to an S7-1200 only via OPC UA (OPC Unified Architecture). Here you can use optimized data blocks or standard data blocks. Access to optimized data blocks is preset in the TIA Portal.

You need an OPC Client which supports OPC UA in order to access optimized data blocks via OPC UA and for using the OPC Server V12 or higher.

This entry shows how to configure an S7 connection between the S7-1200 V4 and the PC station in order to be able to use an OPC client which supports OPC UA.

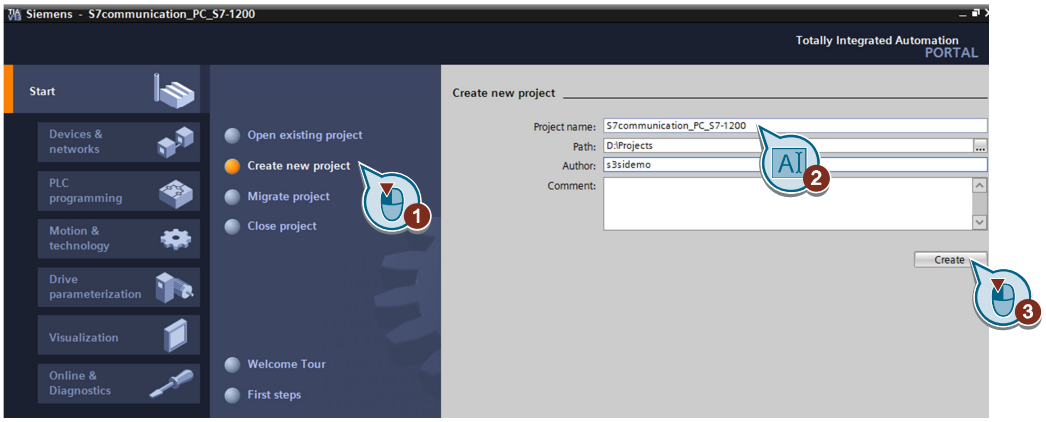
Create a project

In Windows, select the command "Start > All Programs > Siemens Automation > TIA Portal V13" to start the TIA Portal.

1. In the Portal view, select the "Create new project" action.
2. Enter the project name in the appropriate field.

Click the "Create" button to create a new project.

Figure 3-1



Switch to Project View

Use the "Project View" link to switch to the Project View.

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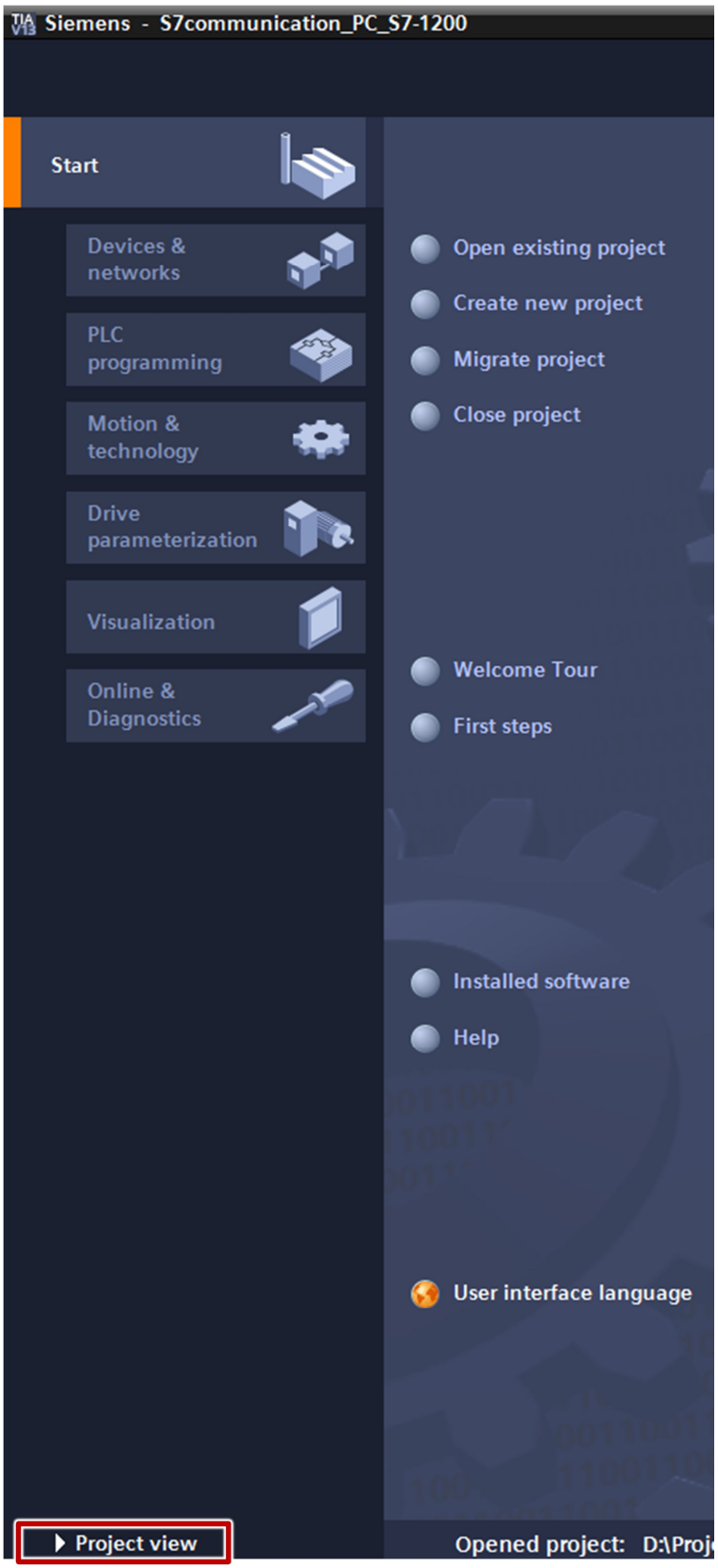
Figure 3-2



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3.1 Configuration of the S7-1200

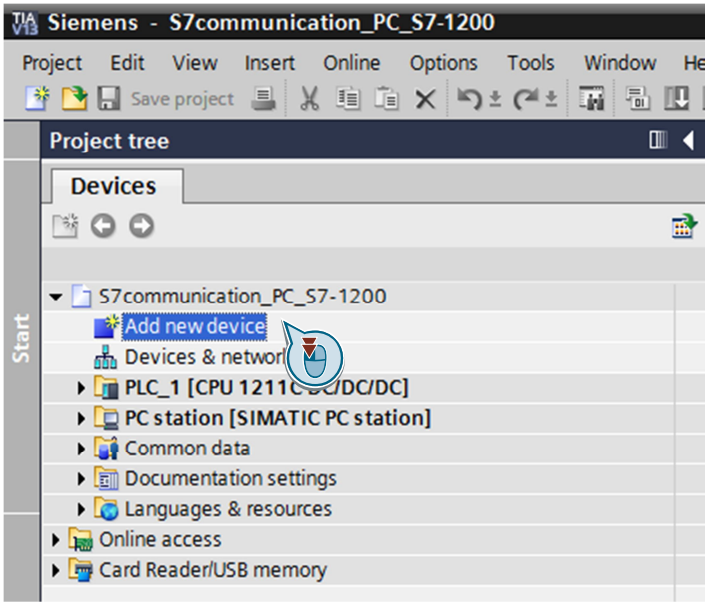
You configure your S7-1200 station in the TIA Portal. Then you create the user program and define which data is to be monitored over the S7 connection of the OPC server.

3.1.1 Configure the Hardware

Add an S7-1200 station

In the Project tree, double-click the "Add new device" item. The "Add new device" dialog opens.

Figure 3-3



3. Click the "Controllers" button in the working area.
4. Go to "Controllers > SIMATIC S7-1200 > CPU" and select the required controller.
5. Click the "OK" button to add the selected S7-1200 CPU to your project.

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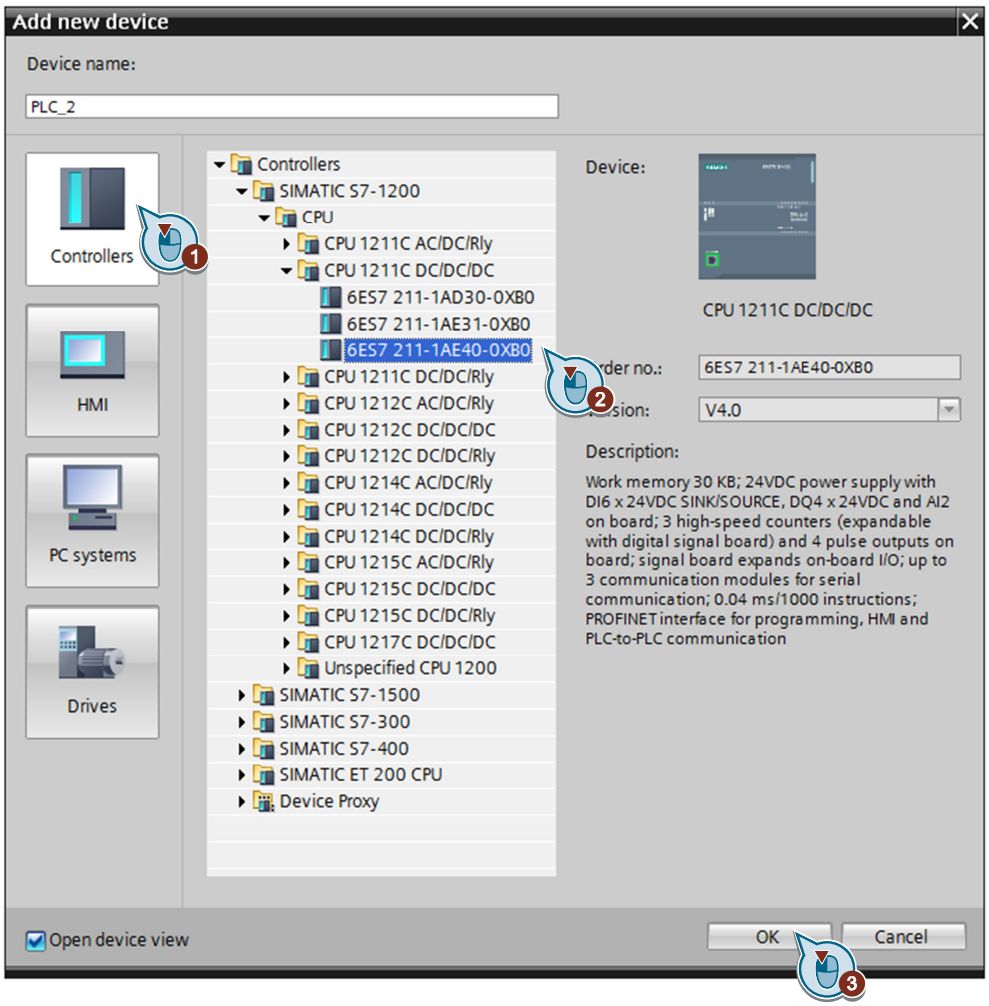
Figure 3-4



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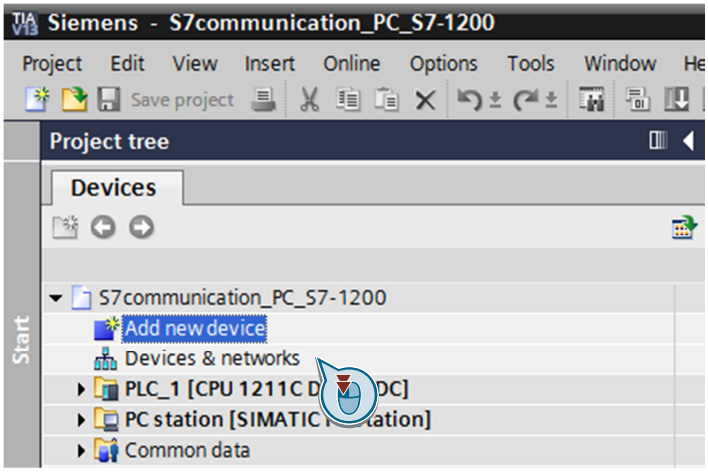
Define IP address and assign subnet

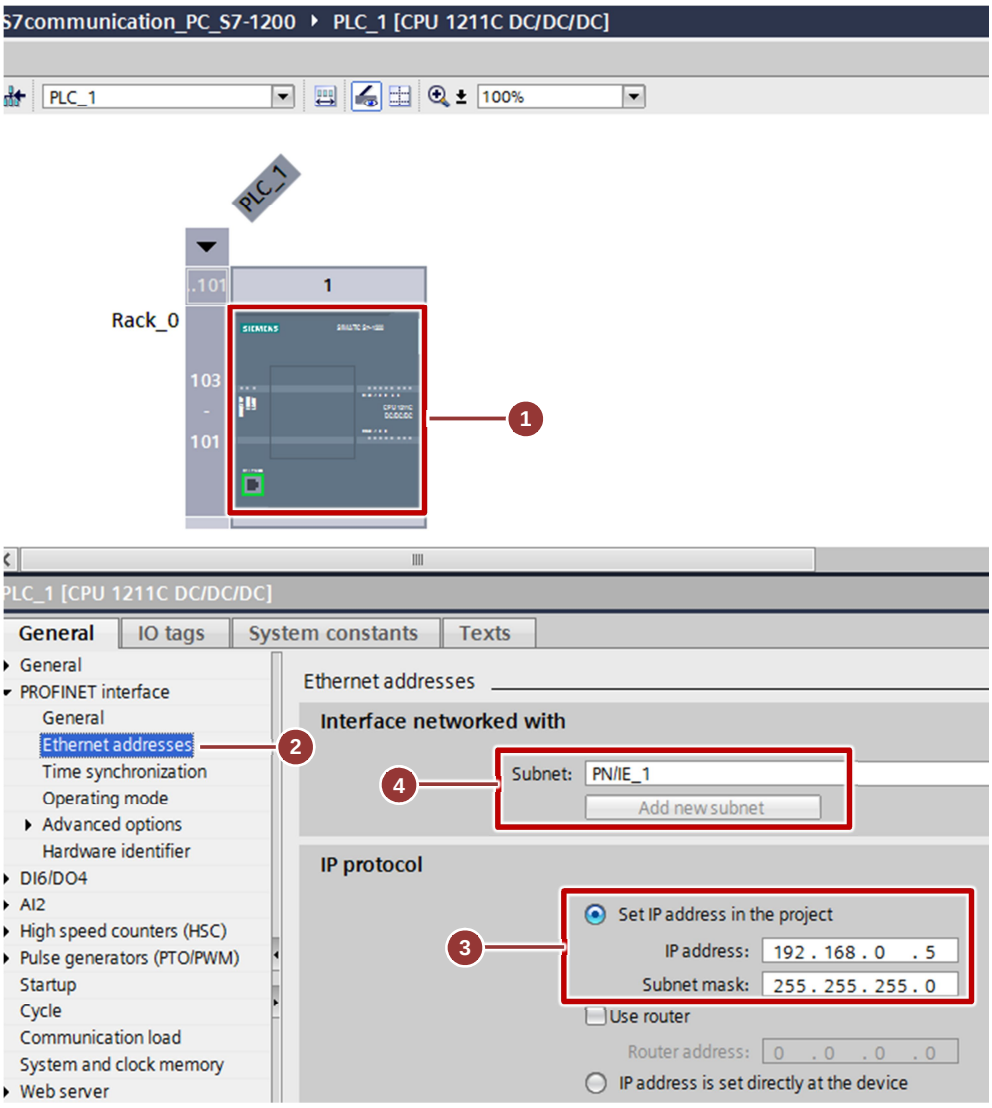
In the Project tree, double-click the "Devices and Networks" item. The Devices and Networks editor opens.

Figure 3-5



1. In the Network View or Device View of the Devices and Networks editor you mark the S7-1200 CPU.
2. The properties of the S7-1200 CPU are displayed in the inspector window. Go to the "General" tab and in the area navigation you select the "PROFINET interface > Ethernet addresses" item.
3. In this example you enter the IP address 192.168.0.5 and the subnet mask 255.255.255.0 for the PROFINET interface of the S7-1200 CPU.
4. Assign a subnet to the PROFINET interface. Click the "Add new subnet" button to create a new subnet.

Figure 3-6



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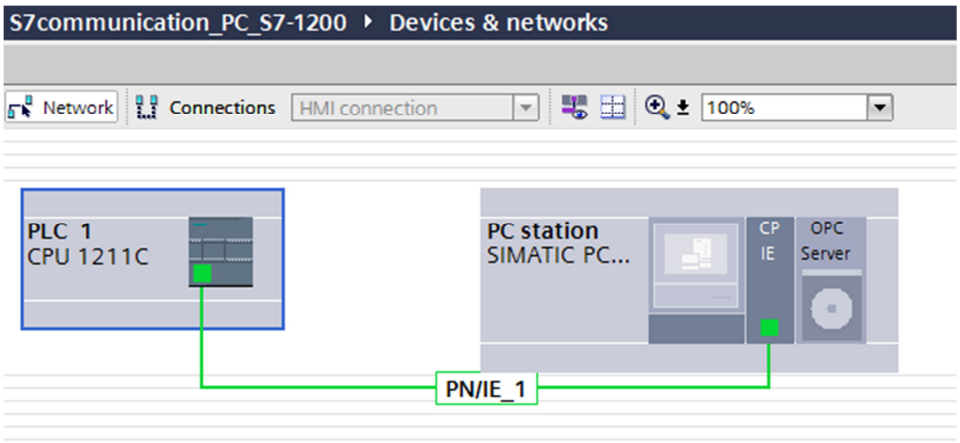
The connection between the subnet, PN/IE_1, for example, and the S7-1200 is now displayed in the "Network View" of the Devices and Networks editor.

Figure 3-7



Permit access with PUT/GET communication from remote partner (PLC, HMI, OPC …)

In this example the S7-1200 CPU is server for the S7 connection, in other words it participates passively in establishing the connection.

The PC station is client for the S7 connection, in other words the PC station actively establishes the S7 connection.

In the S7-1200 CPU you must permit the client-side access to the CPU data, which means that the communication services of the CPU are then no longer restricted. Proceed as follows.

1. In the Network View or Device View of the Devices and Networks editor you mark the S7-1200 CPU.
2. The properties of the S7-1200 CPU are displayed in the inspector window. Go to the "General" tab and in the area navigation you select the "Protection" item.
3. Enable the "Permit access with PUT/GET communication from remote partner (PLC, HMI, OPC …)" function.

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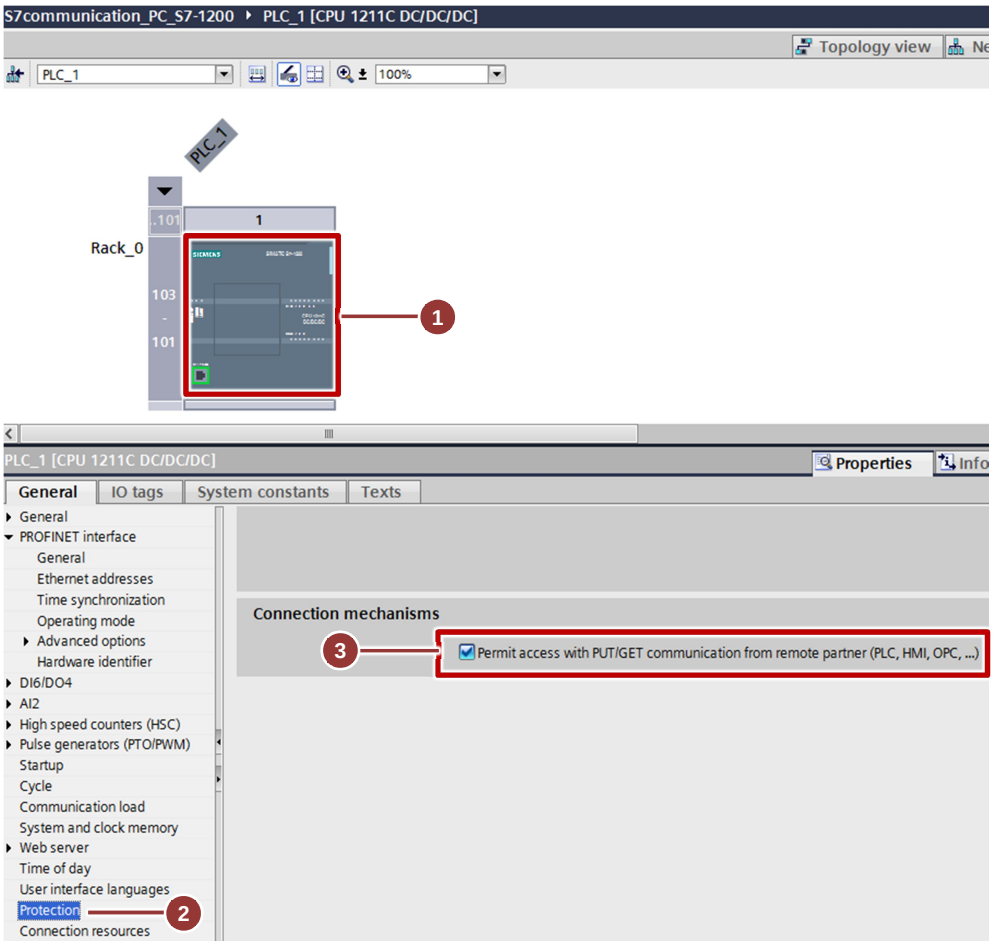
Figure 3-8



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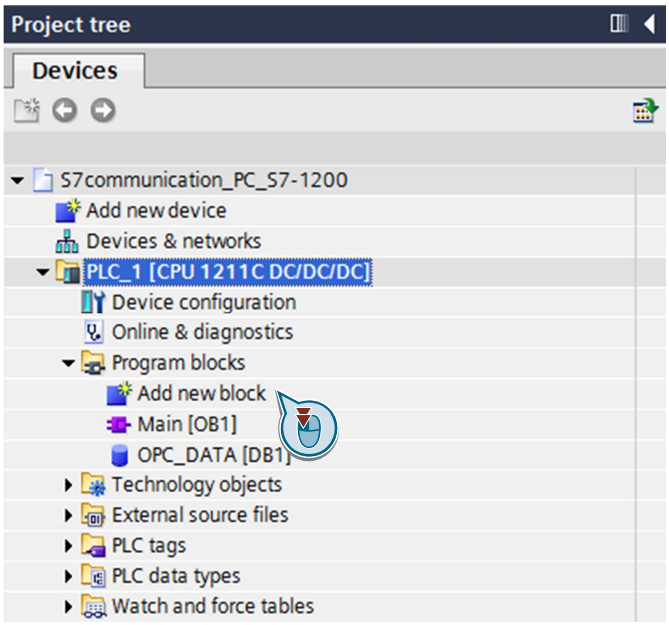
3.1.2 Create a User Program

Add a data block

In the project tree, navigate to the device folder of the S7-1200 CPU, "PLC_1 [CPU 1212C …]", for example. The device folder contains structured objects and actions that belong to the device.

In the device folder you navigate to the "Program blocks" subfolder and double-click the "Add new block" action. The "Add new block" dialog opens.

Figure 3-9



1. Click the "Data block (DB)" button.
2. Enter the name of the data block.
3. If the "Automatic" option is enabled, the number of the data block is assigned automatically.
   Enable the "Manual" option if you want to assign the desired number of the data block manually.
4. Apply the settings with "OK".

The data block DB1 "OPC_DATA" is created in this example.

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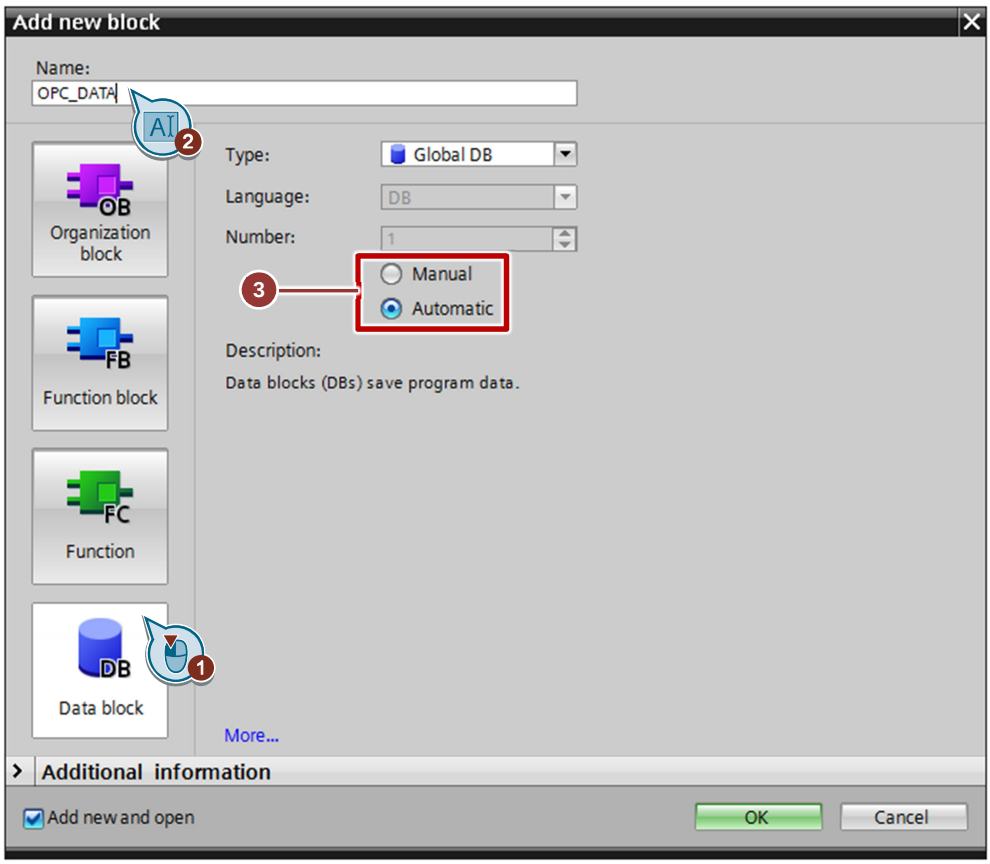
Figure 3-10



In the Properties of the data block, under "Attributes" you enable the "Optimized block access" option.

Data blocks with optimized access do not have a specifically defined structure. The data elements receive only one symbolic name in the declaration and no fixed address in the block. The elements are automatically arranged in the available memory area of the block so that there are no gaps in the memory. In this way the memory capacity is optimally used.
Tags in these data blocks are identified by their symbolic name. In order to address the tags you enter the symbolic names of the tags.

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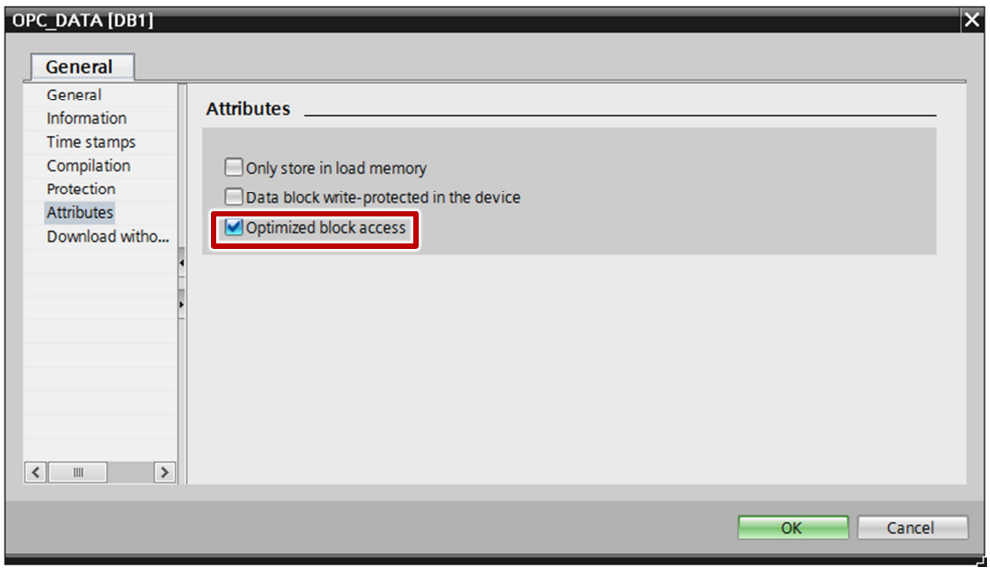
Figure 3-11

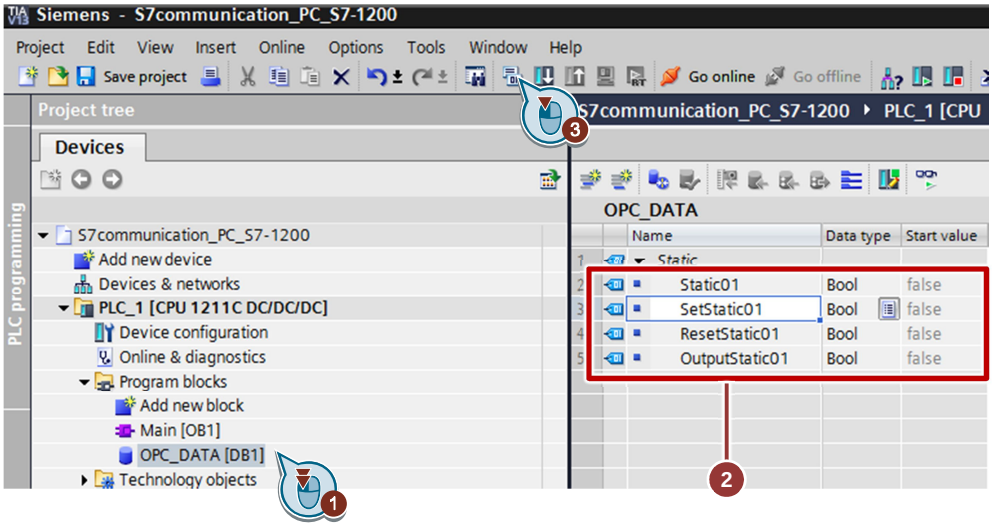


Define static tag in the data block

Define 4 static tags of the "Bool" data type in the DB1 "OPC_DATA".

1. In the Project tree you go to the "Program Blocks" folder and double-click the data block DB1 "OPC_DATA". The data block DB1 "OPC_DATA" opens in the working area.
2. Insert 4 static tags of the "Bool" data type in the data block DB1 "OPC_DATA".
   - Static01
   - SetStatic01
   - ResetStatic01
   - OutputStatic01
3. Click the "Compile" button.

Figure 3-12



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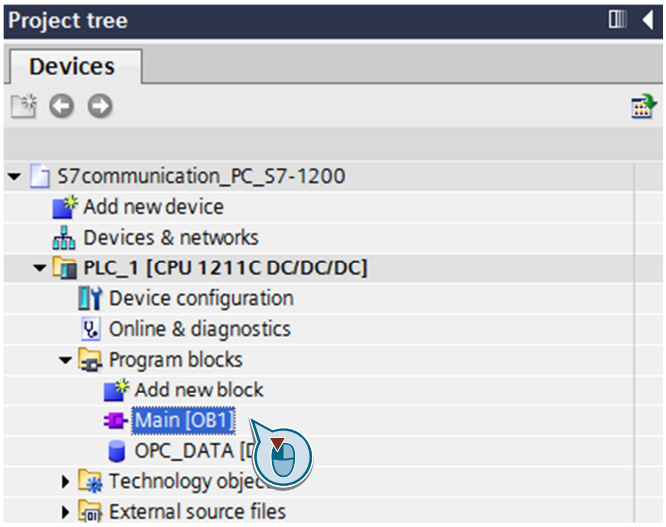
Create Main [OB1]

In the "Program blocks" folder, you double-click the "Main [OB1]" block to open the corresponding dialog window.

Figure 3-13



Create the program as shown in Figure 3-14. The bit links are in the "Instructions" task card under "Basic instructions > Bit links".

Use drag-and-drop to add the normally open contact, the flip-flop and the Assignment to Network 1 of the "Main [OB1]" block.

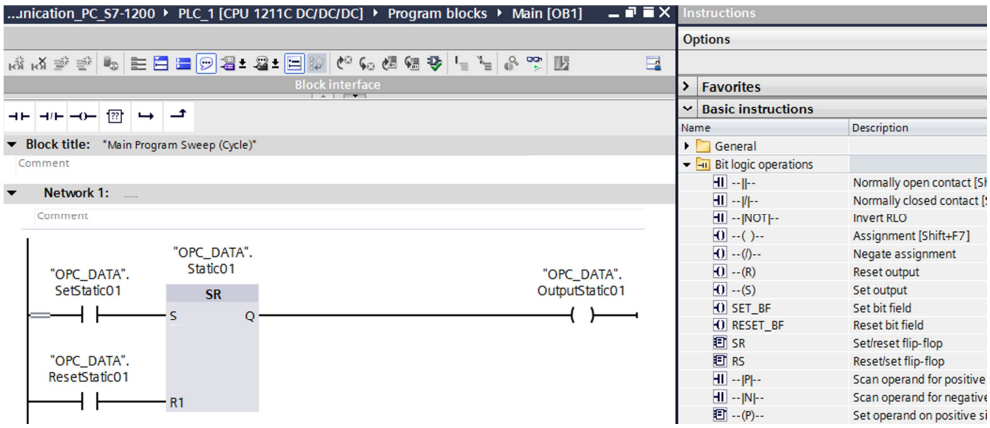
Assign the tags assigned in Table 3-1 to the flip-flop, to the normally open contact at inputs S and R of the flip-flop and to the assignment at output Q of the flip-flop.

Click the "Compile" button.

Table 3-1

Symbolic name of the tag	Description
"OPC_DATA".SetStatic01	SR flip-flop input S: Normally open contact
"OPC_DATA".ResetStatic01	SR flip-flop input R: Normally open contact
"OPC_DATA".Static01	SR variable
"OPC_DATA".OutputStatic01	SR flip-flop output Q: Assignment

Figure 3-14



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3.2 Configuration of the PC Station

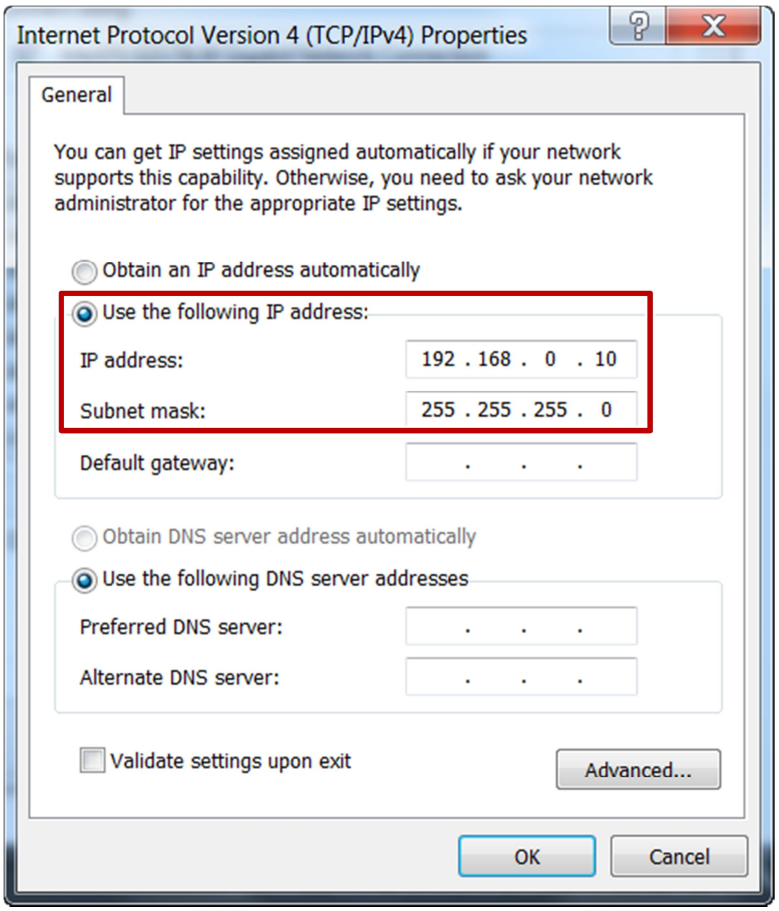
Before you start configuring the PC station in the TIA Portal, determine or change the IP address of the network card via which the PC station is connected to the S7-1200. You enter the IP address and subnet mask of the network card when you configure the PC station in the TIA Portal.

Determine and change the IP address and subnet mask of the network card

In Windows you open the "Network and Sharing Center" and select the "Change adapter settings" function. Open the Properties dialog of the network card via which the PC station is connected with the S7-1200.

In this example the network card receives the IP address 192.168.0.10 and subnet mask 255.255.255.0.

Figure 3-15



NOTE The IP address configured for the PC station in the TIA Portal must match the IP address set in Windows.

If you are not using a router, then the IP addresses of the PC station and the S7-1200 CPU must be in the same subnet.

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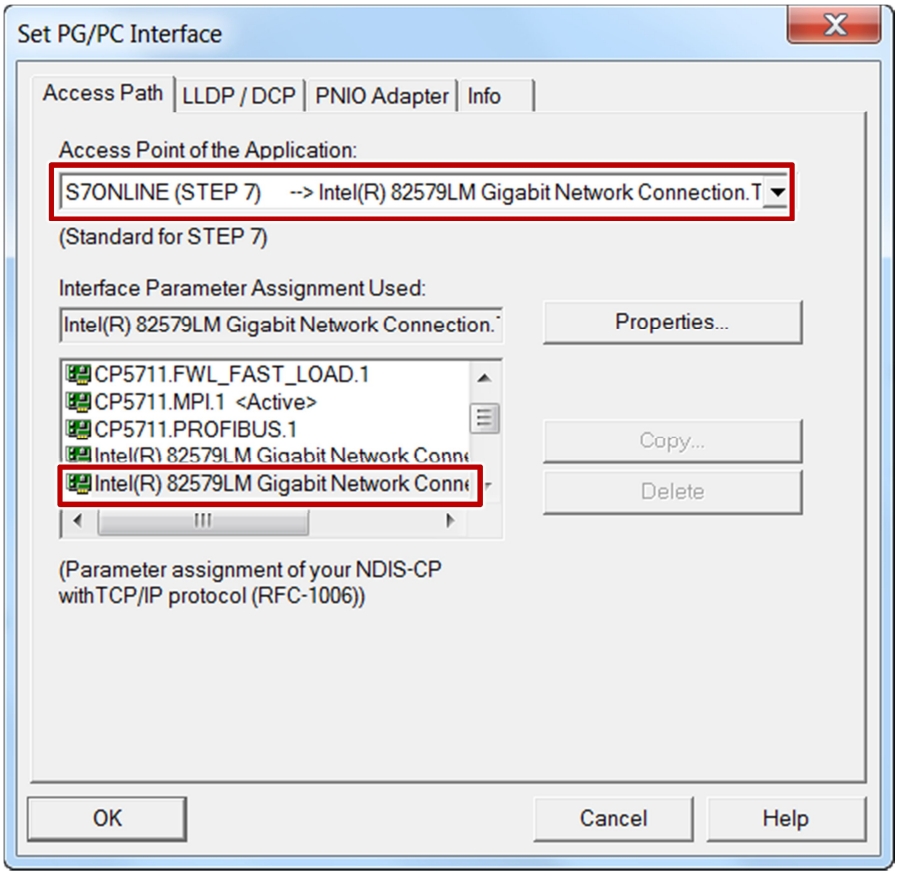
Setting the PG/PC interface

Go to the Control Panel and start the configuration program "Set PG/PC Interface": "Start > Settings > Control Panel > Set PG/PC Interface".

In the "Access Point of the Application" list box you select the access point "S7ONLINE".

In the "Interface Parameter Assignment Used" list box you select the network card with TCP/IP to which the S7-1200 CPU is connected.

Figure 3-16



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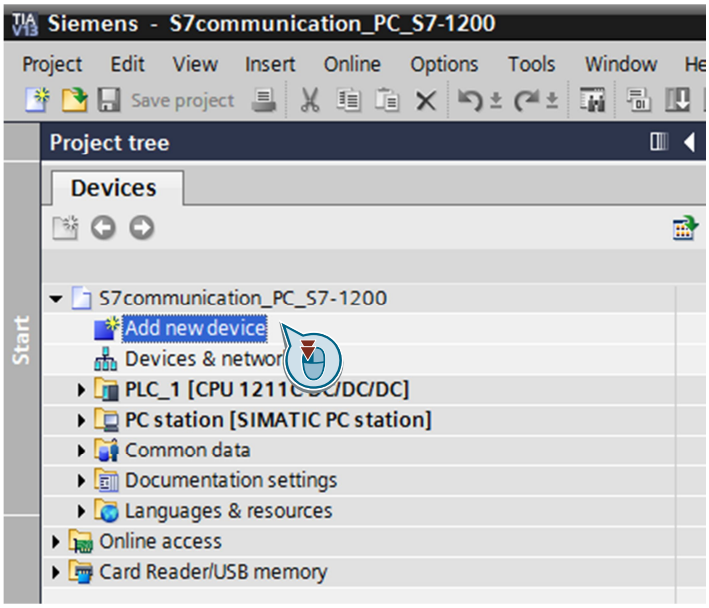
Add a PC station

In the TIA Portal you open the project that contains the configuration for the S7-1200 station.

In the Project tree, double-click the "Add new device" item. The "Add new device" dialog opens.

Figure 3-17



1. Click the "PC systems" button in the working area.
2. Go to "PC systems > PC general" and select the "PC station" item.
3. Click the "OK" button to add a PC station named "PC Station" to your project.

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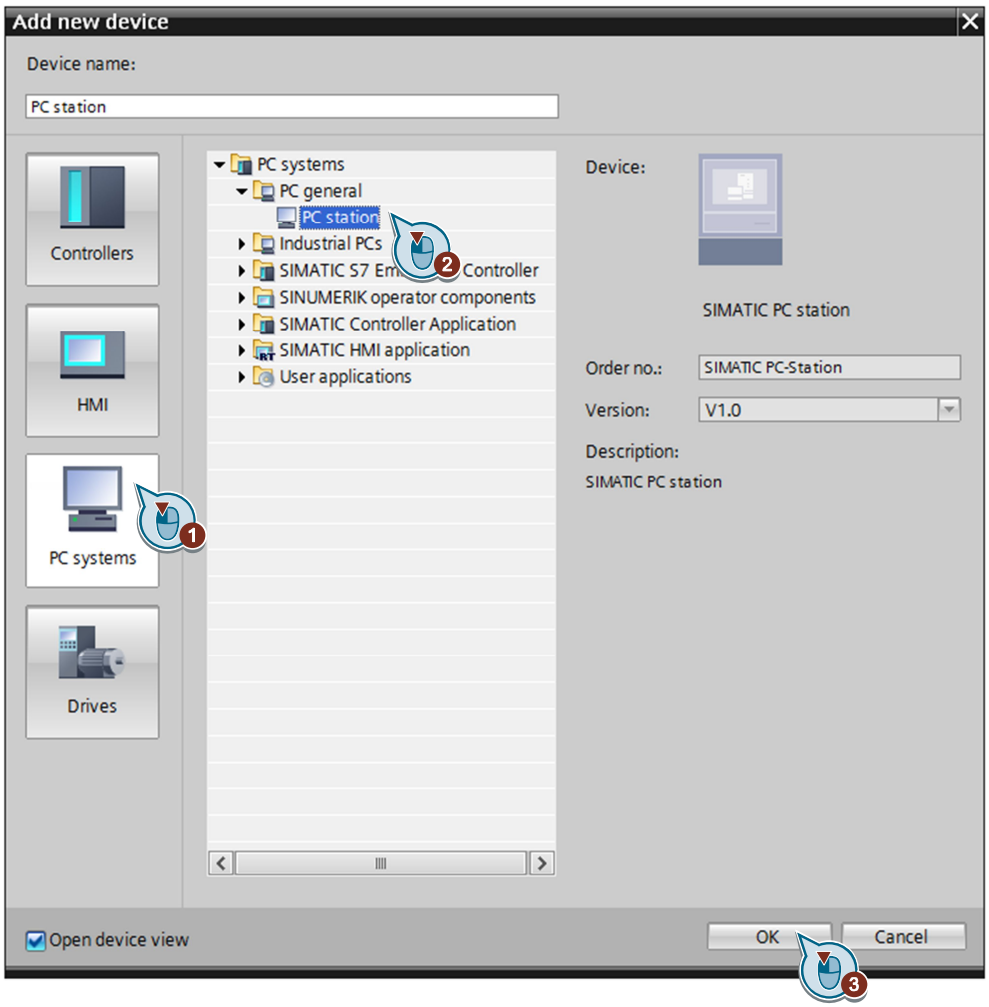
Figure 3-18



Open the "Device View" of the PC station in the Devices and Networks editor

In the Project tree, navigate to the device folder of the PC station, "PC Station [PC station]", for example. The device folder contains structured objects and actions that belong to the device.

In the device folder double-click the "Device configuration" object to open the "Device View" of the PC station in the Devices and Networks editor.

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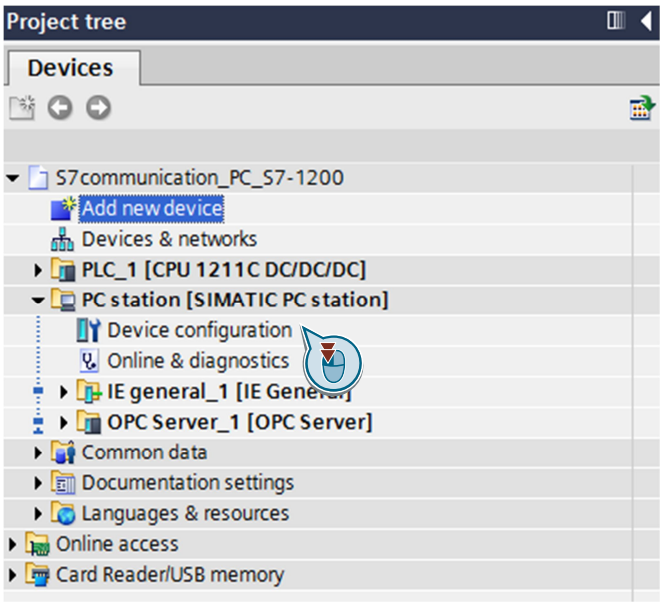
Figure 3-19

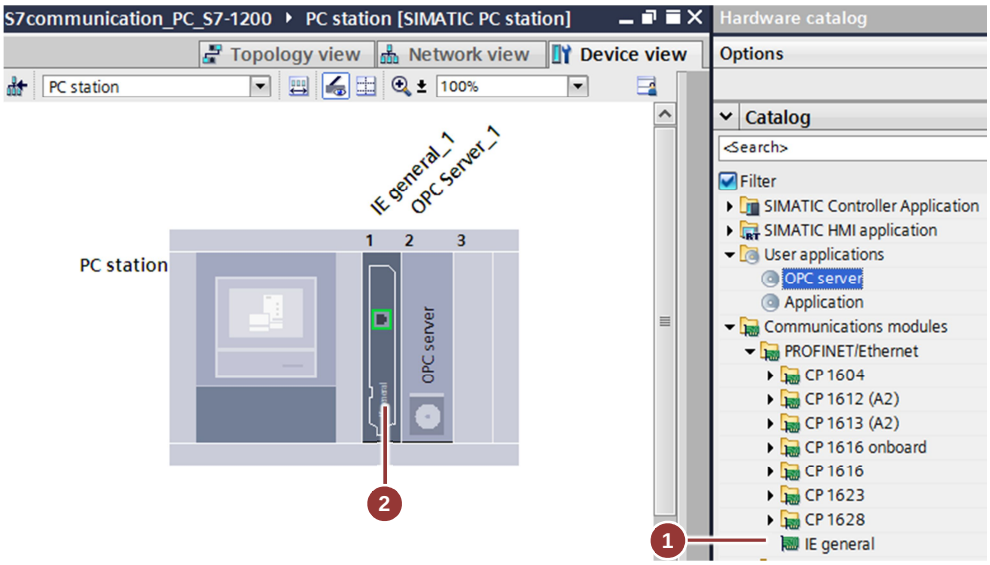


Configure user application and communication module of the PC station

In the "Device View" of the PC station you configure and parameterize the modules of the PC station.

1. In the Hardware Catalog, the "Catalog" palette contains the user applications and communication modules which you can configure in the PC station. Mark the "IE General" communication module.
2. Using drag-and-drop you add the "IE General" communication module to Slot 1 of the PC station.

Figure 3-20



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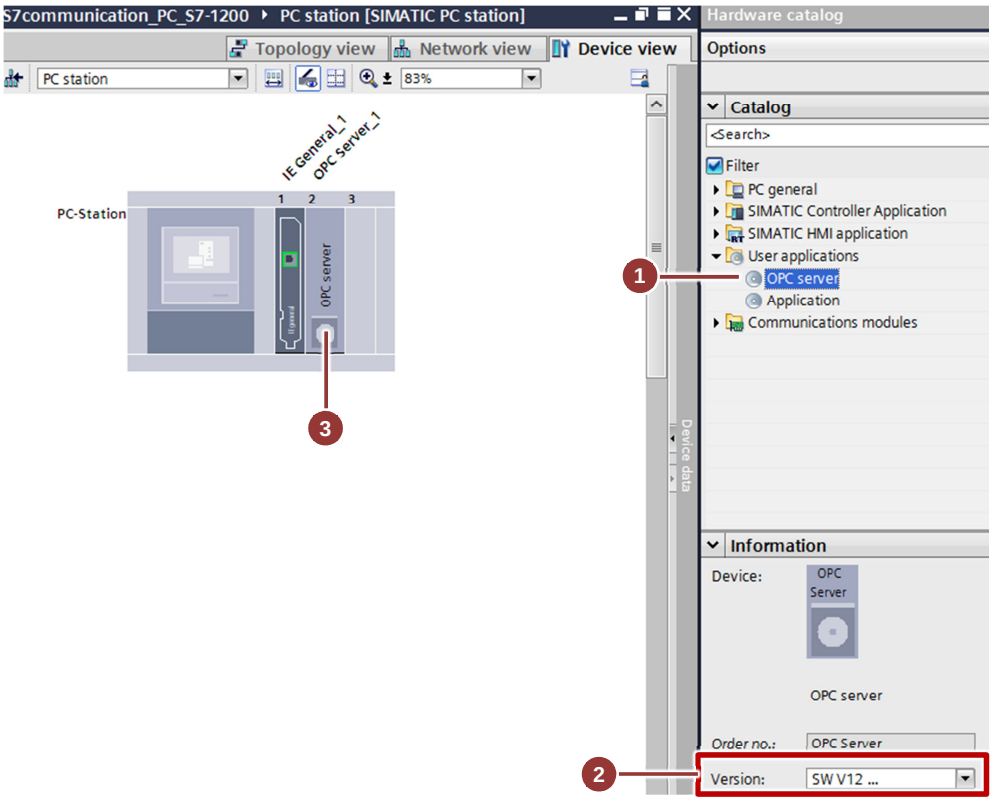
1. In the Hardware catalog you go to the "Catalog" palette and mark the user application "OPC Server".
2. In the "Information" palette you select the version "SW V12…" or higher for the OPC server. This ensures that an S7 connection is created later with access to optimized data blocks.
3. Add the "OPC server" user application to Slot 2 of the PC station.

Figure 3-21



Define IP address and assign subnet

In the Project tree, double-click the "Devices and Networks" item. The Devices and Networks editor opens.

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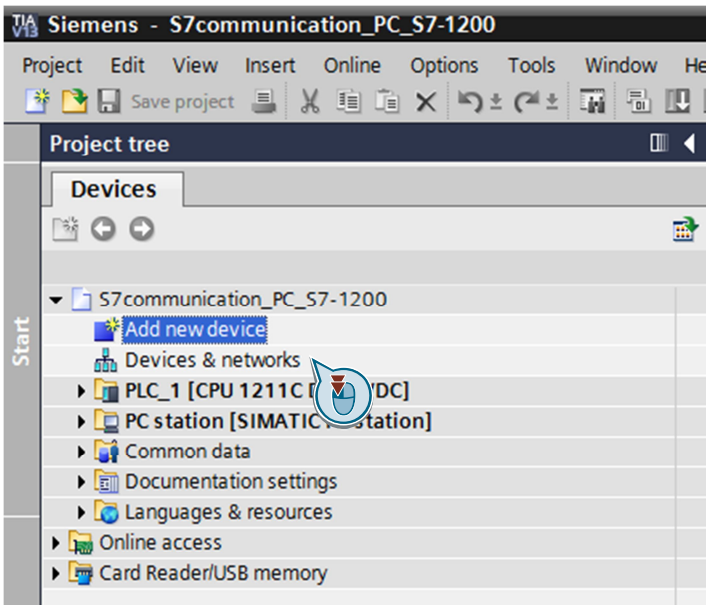
Figure 3-22



1. In the Network View or Device View of the Devices and Networks editor you mark the network card in the PC station.
2. The properties of the network card are displayed in the inspector window. Go to the "General" tab and in the area navigation you select the "PROFINET interface > Ethernet addresses" item.
3. In this example you enter the IP address 192.168.0.10 and subnet mask 255.255.255.0 for the network card.
4. Select the subnet that you have already assigned to the S7-1200 CPU and assign it also to the network card of the PC station.

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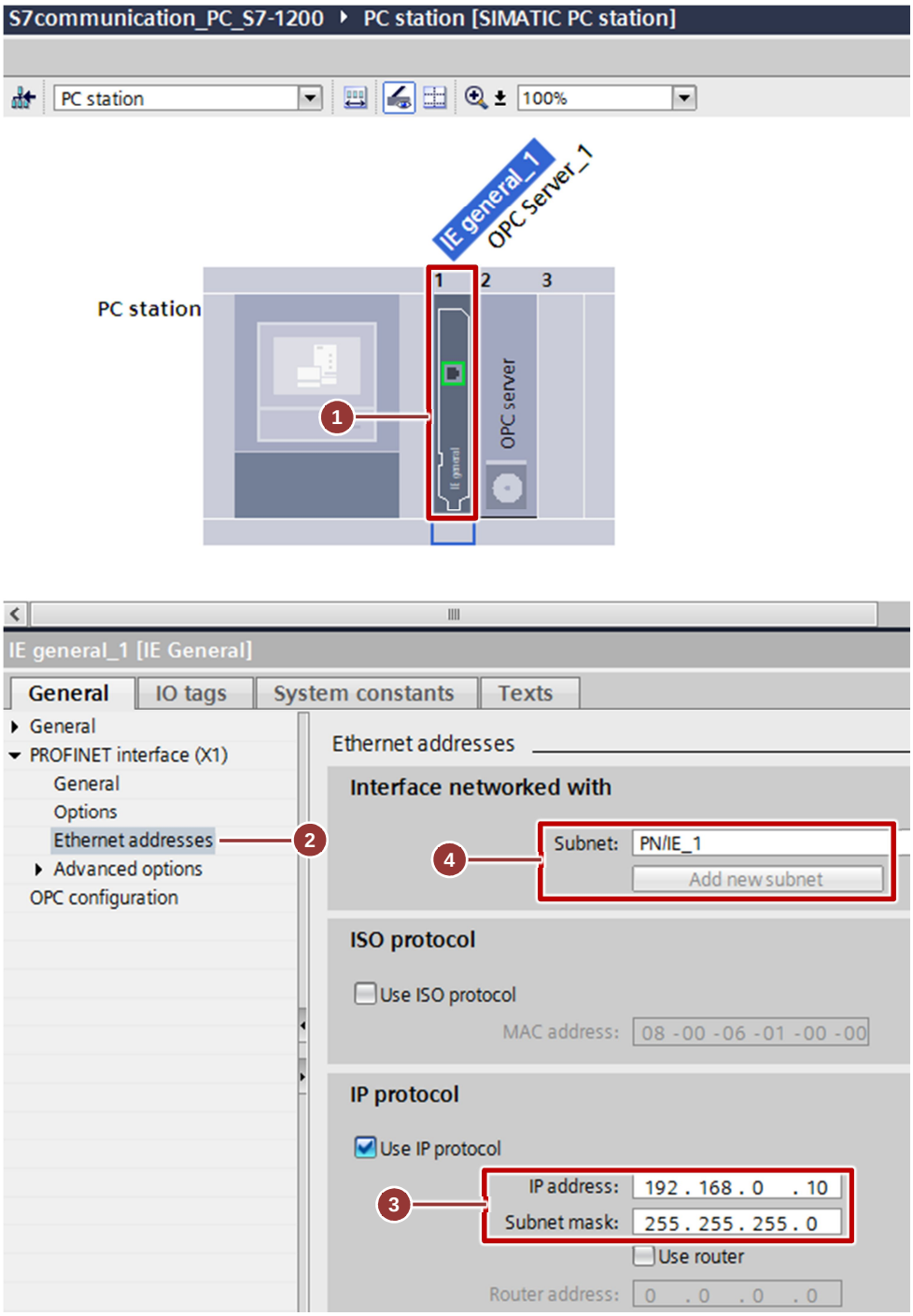
Figure 3-23



NOTE The IP address configured for the PC station in the TIA Portal must match the IP address set in Windows.

If you are not using a router, then the IP addresses of the PC station and the S7-1200 CPU must be in the same subnet.

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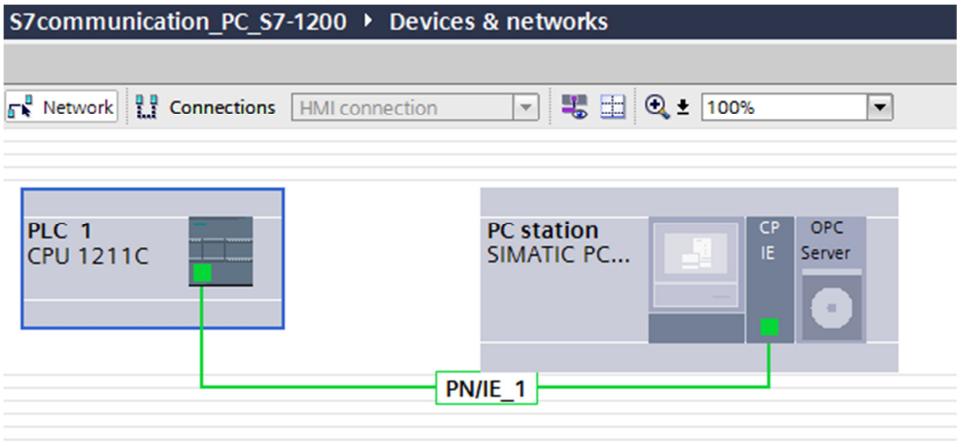
The connection between the subnet, PN/IE_1, for example, and the S7-1200 and the PC station is now displayed in the "Net View" of the hardware and device editor.

Figure 3-24



Use symbols

1. In the Network View or Device View of the Devices and Networks editor you mark the OPC server in the PC station.
2. The properties of the OPC server are displayed in the inspector window. Go to the "General" tab and in the area navigation you select the "S7 > OPC tags" item.
3. Select the "All" option.

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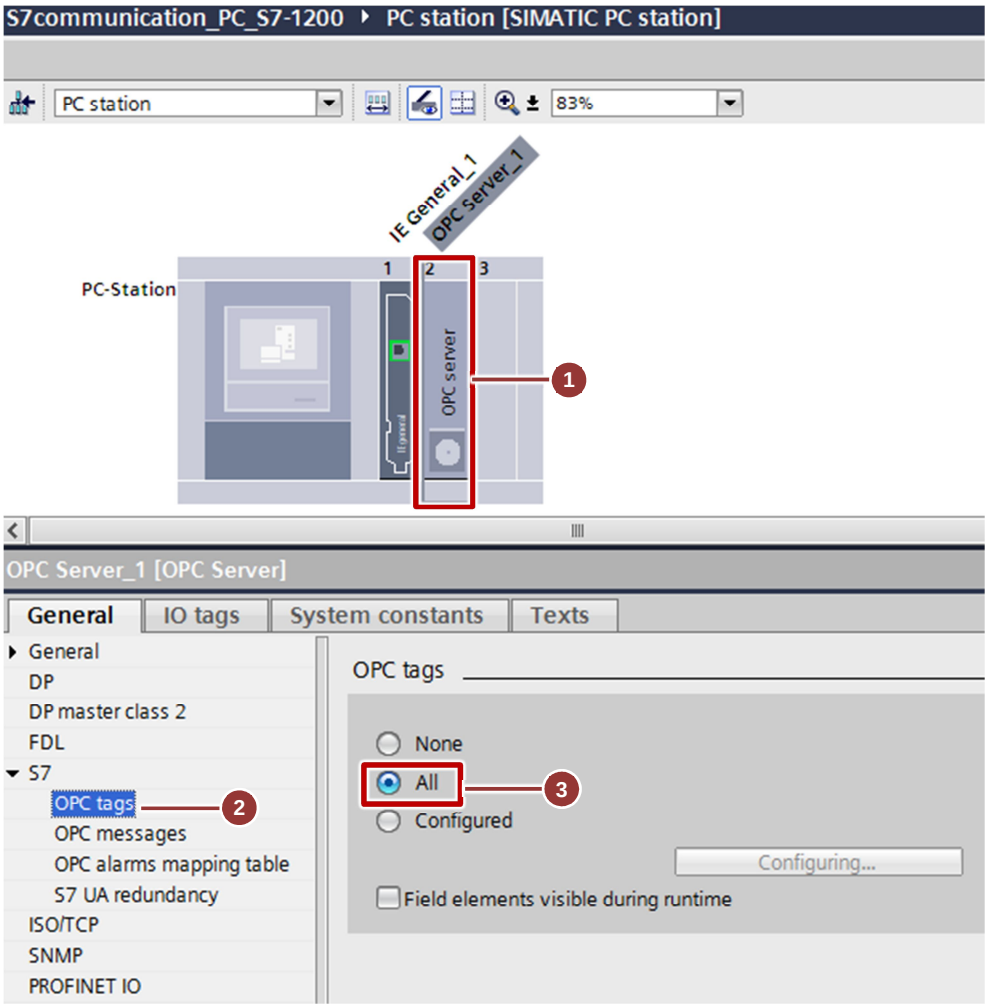
Figure 3-25



3.3 Configure the S7 Connection

3.3.1 Add the S7 Connection

In the Project tree, double-click the "Devices and Networks" item to open the Devices and Networks editor.

1. In the toolbar of the Network View, click the "Connections" icon to switch to the mode for setting the connections.
2. In the drop-down list box you select "S7 connection" as connection type.

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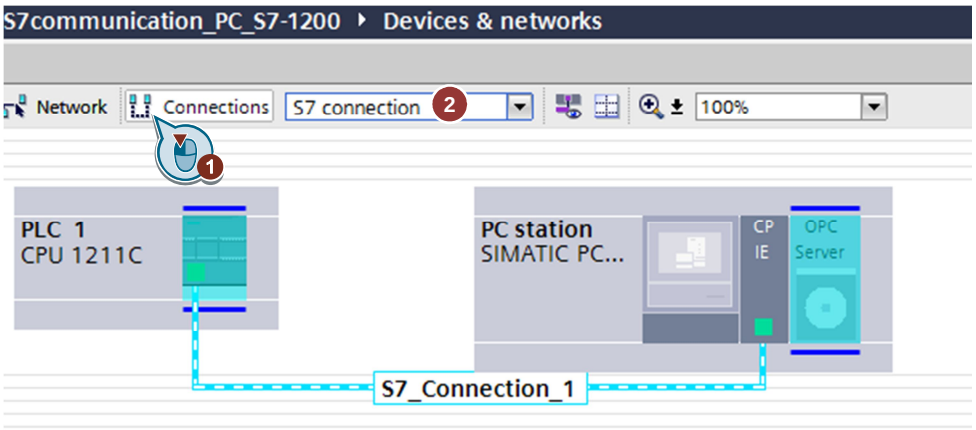
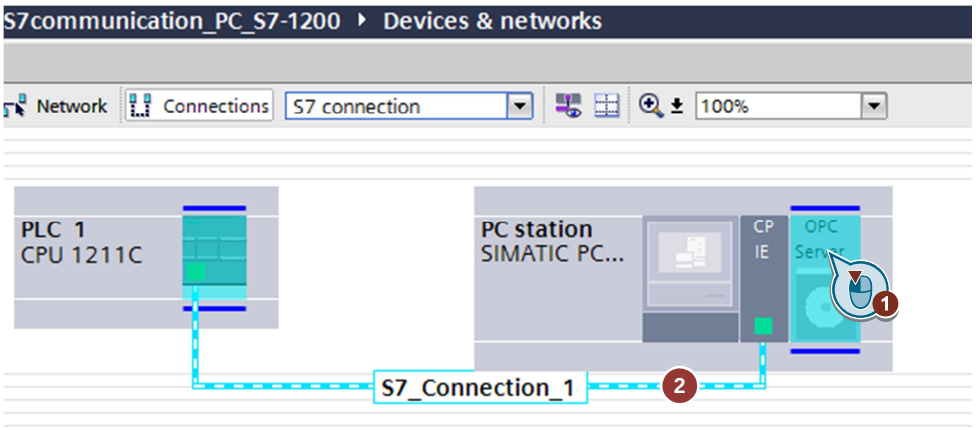
Figure 3-26



1. In the graphical area of the Network View, click the OPC server in the PC station and connect it to the S7-1200 CPU.
2. In the Network View, the S7 connection is displayed in the graphical area.

Figure 3-27



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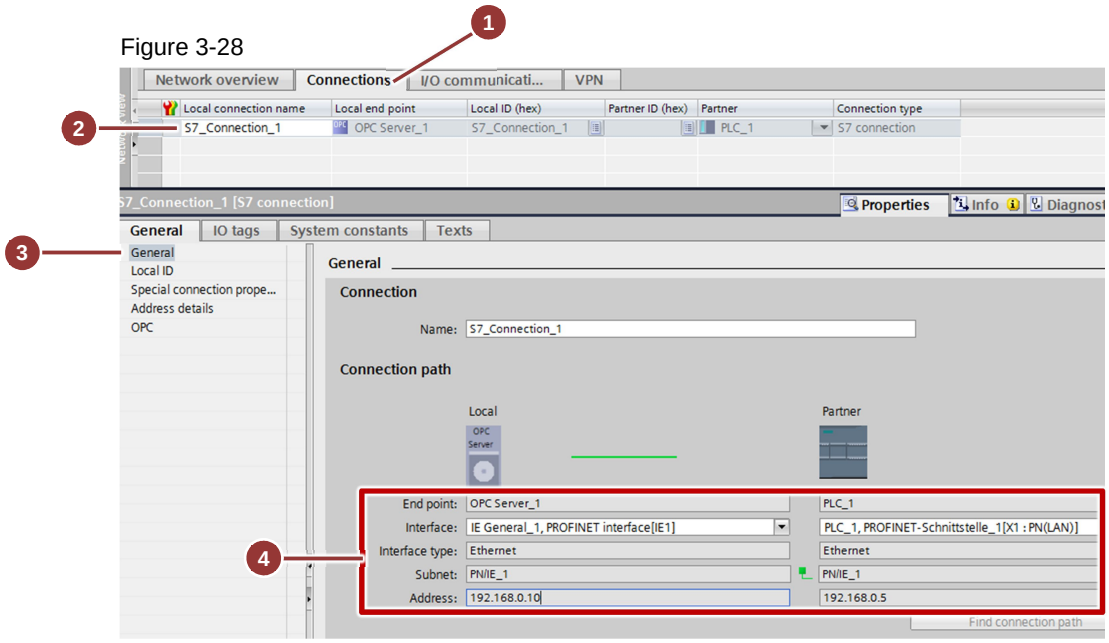
3.3.2 Display and Change Properties of the S7 Connection in the Inspector Window

1. In the table area of the Network view you open the "Connections" table. The S7 connection just configured is displayed.
2. Select the displayed S7 connection. The properties of the S7 connection are displayed in the inspector window.

General properties

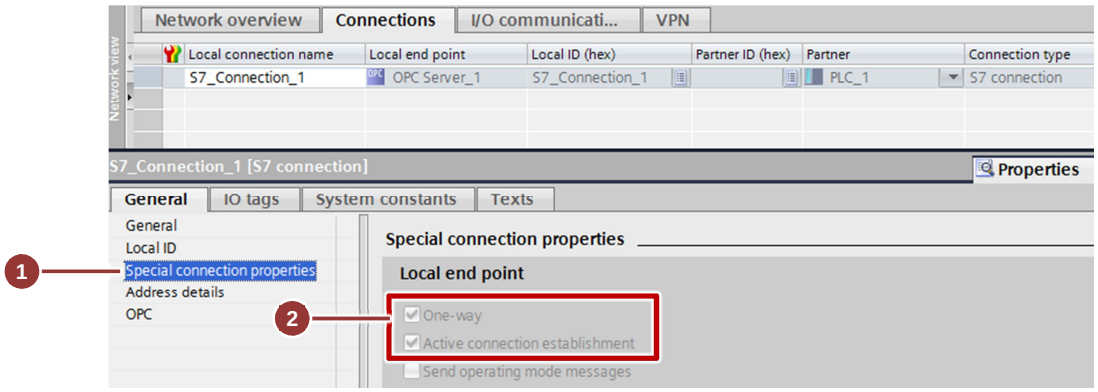
3. Go to the "General" tab and in the area navigation you select the "General" item to display the connection path.
4. The S7 connection is between the OPC server and the S7-1200 CPU.

Figure 3-28



1. Go to the "General" tab and in the area navigation you select the "Special connection properties" item.
2. Here you see a display of the special connection properties of the local end point, "Active connection establishment", for example. You cannot change this option because it is a unilaterally configured S7 connection.
   In this example, the OPC server must actively establish the S7 connection. The communication partner, the S7-1200 CPU, participates passively in establishing the connection.

Figure 3-29



1. Go to the "General" tab and in the area navigation you select the "Address details" item.
2. Here you have a display of the local end point, the partner end point and the TSAP of both end points.

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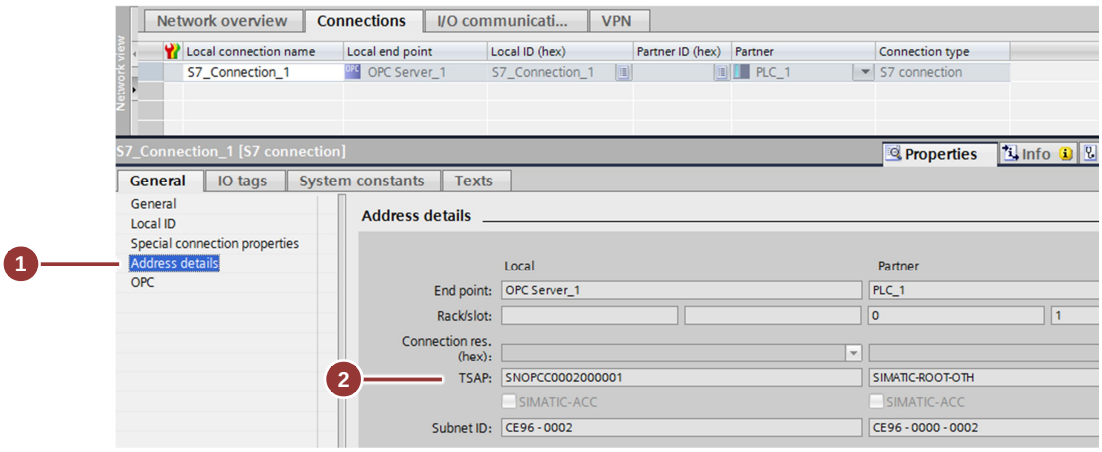
Figure 3-30



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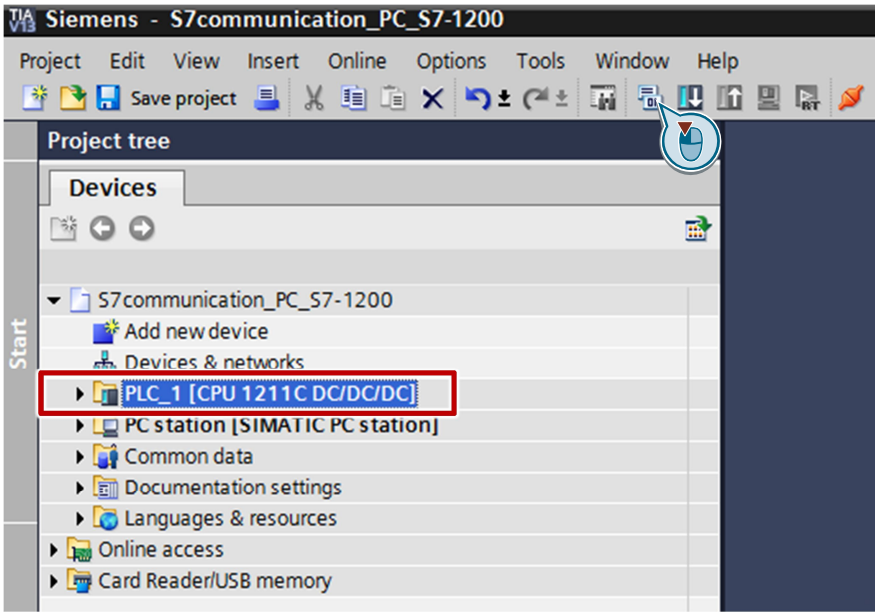
3.4 Compile and Download the Configuration and User Program of the S7-1200

Table 3-2

No.	Description
1.	In the Project tree you mark the device folder of the S7-1200 CPU. In the toolbar you click the "Compile" button. The hardware configuration and the software of the S7-1200 are compiled. 

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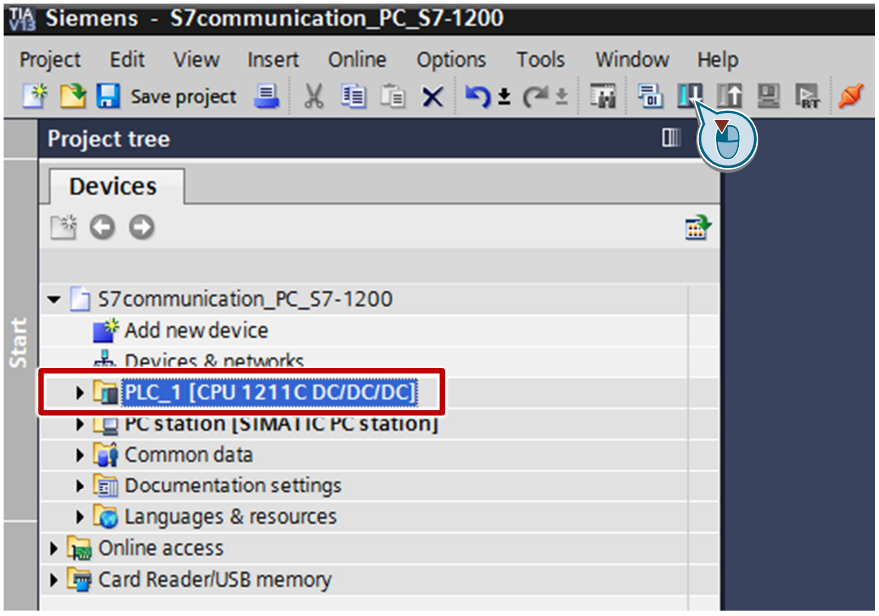
No.	Description
2.	In the Project tree you mark the device folder of the S7-1200 CPU. In the toolbar you click the "Download to device" button to download the project into the S7-1200 CPU. The "Extended download to device" or "Load preview" dialog opens automatically. 

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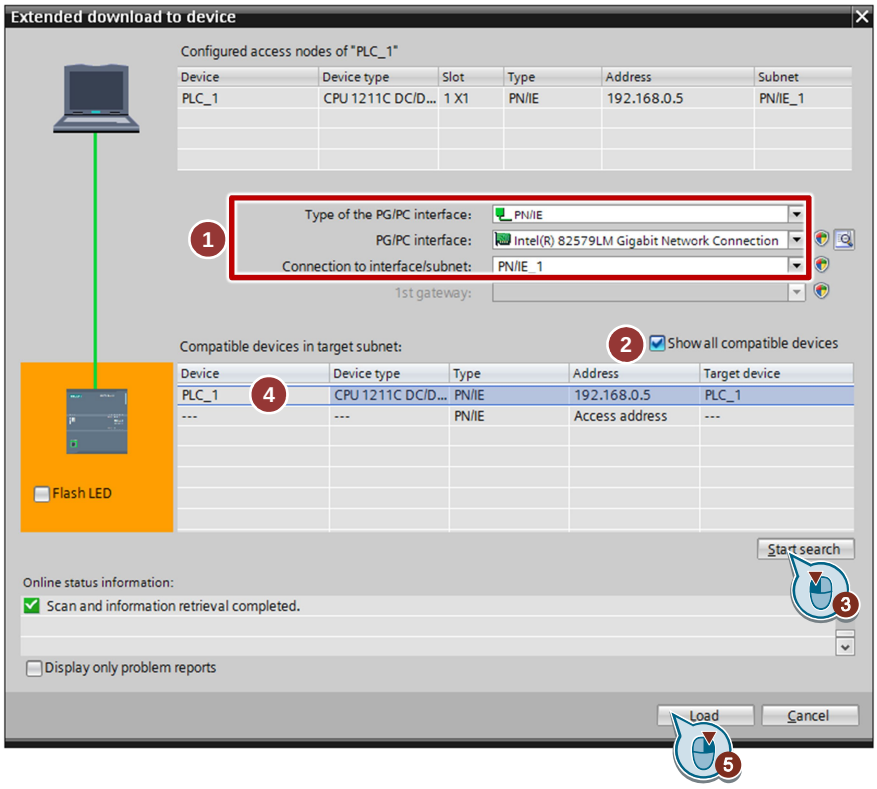
No.	Description
3.	The "Extended download to device" dialog opens automatically only if the access path from the PG/PC to the SIMATIC S7-1200 CPU has to be set. 1. Make the following settings: - Type of the PG/PC interface: PN/IE - PG/PC interface: Network card of the PG/PC - Connection to interface/subnet: Subnet of the S7-1200 CPU, PN/IE_1, for example 2. Enable the "Show all compatible devices" option. 3. Click the "Start search" button. The S7-1200 CPU is displayed in the "Compatible devices in target subnet:" list. 4. Click the "Load" button. 

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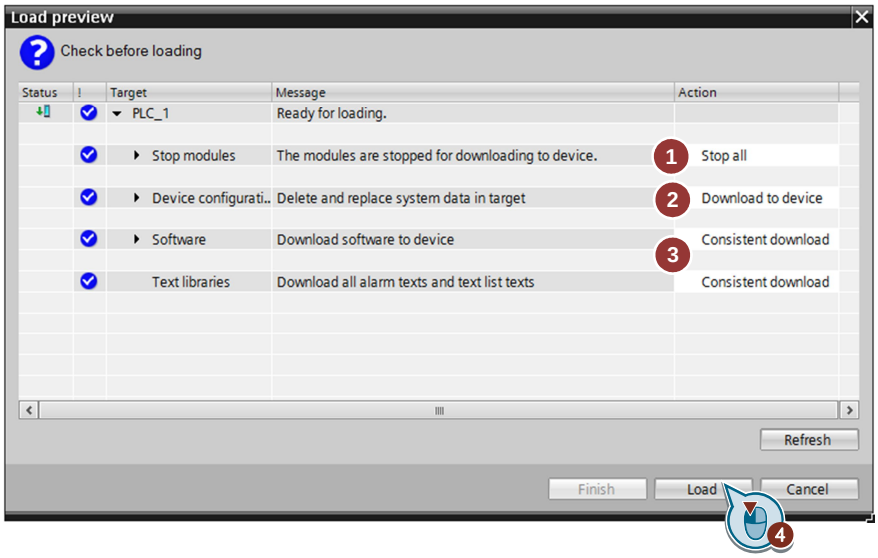
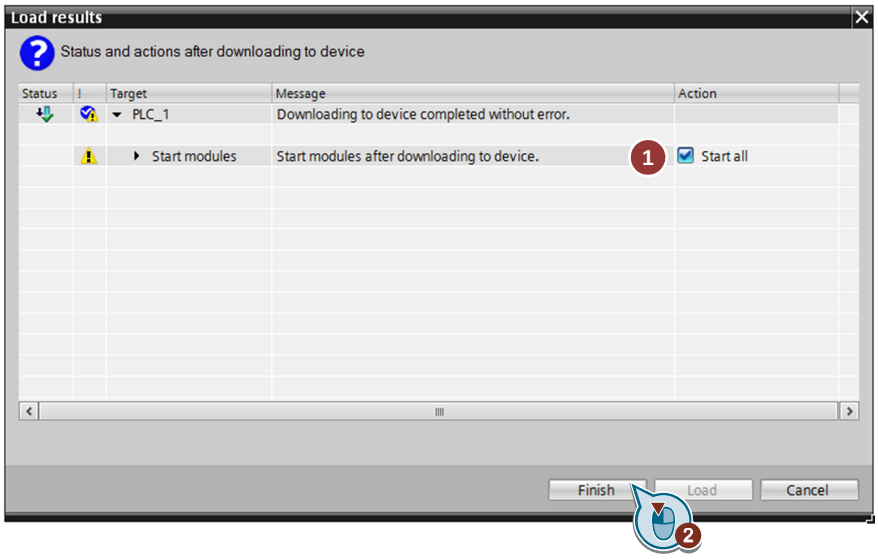
No.	Description
4.	In the "Load preview" dialog you make the following settings. 1. Select the "Stop all" action to stop the modules for downloading to the device. 2. The device configuration is downloaded into the target device (S7-1200 CPU). 3. The software and the text libraries are downloaded consistently to the target device (S7-1200 CPU). 4. Click the "Load" button to start the download procedure. 
5.	In the "Load results" dialog you make the following settings. 1. Enable the action "Start all". 2. Click the "Finish" button to terminate the download procedure. The status LED of the S7-1200 CPU indicates the "RUN" mode after downloading. 

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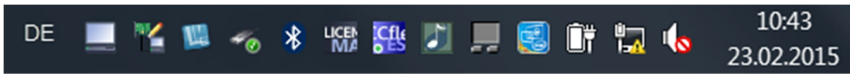
3.5 Compile and Download the PC Station Configuration

Open the Station Configuration Editor

In the Windows taskbar you double-click the "Station Configuration Editor" icon. The Station Configuration Editor opens.

Figure 3-31



1. In the Station Configuration Editor you click the "Add..." button to add the modules, namely the OPC server and the network card, in accordance with the hardware configuration.
2. The modules are used at the following slots:
   - Slot 1: Network card
   - Slot 2: OPC server
3. Click the "Station Name..." button to change the station names. The name of the PC station must be identical in the TIA Portal and in the Station Configuration Editor.
4. The station name "PC station" is used in this example.

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Figure 3-32

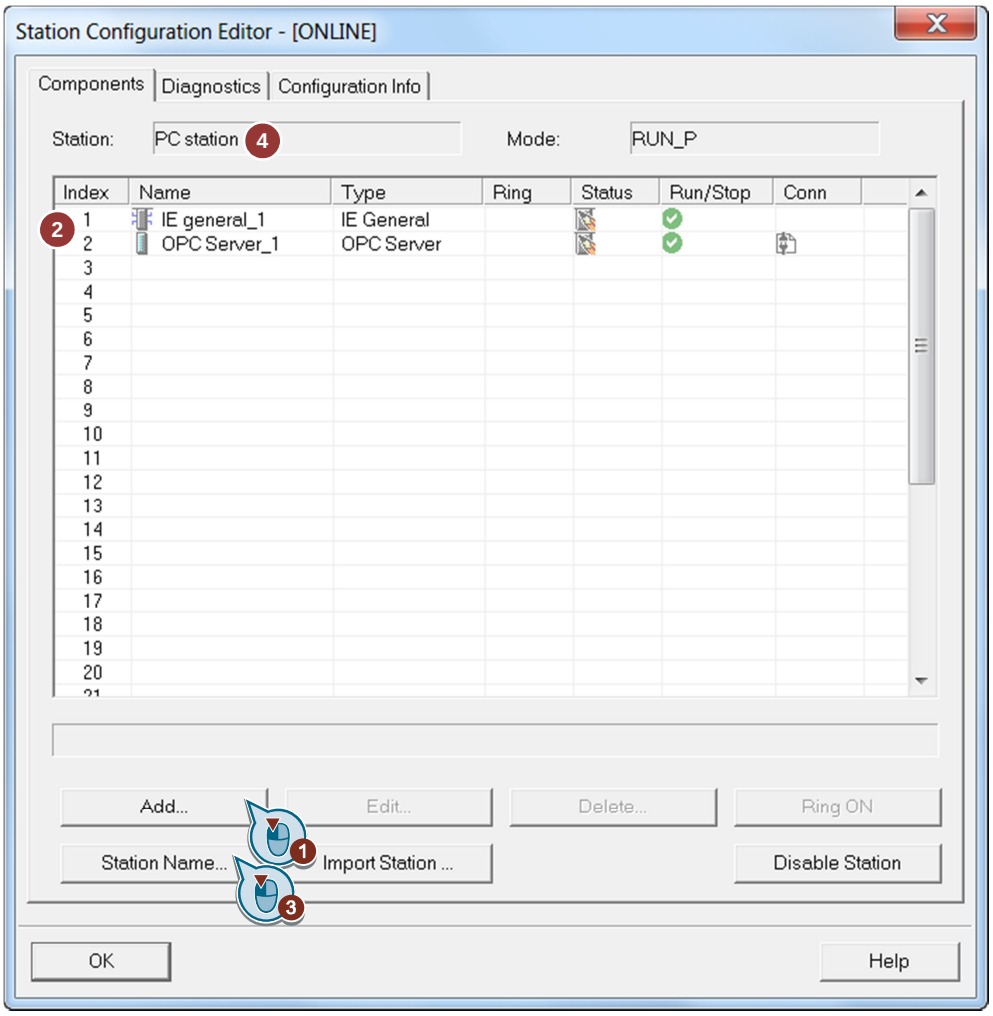

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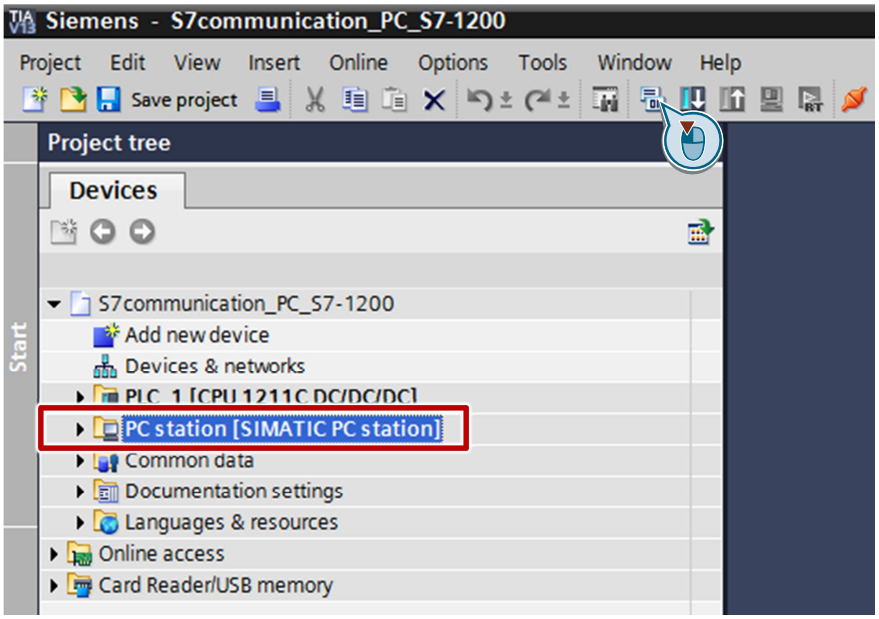
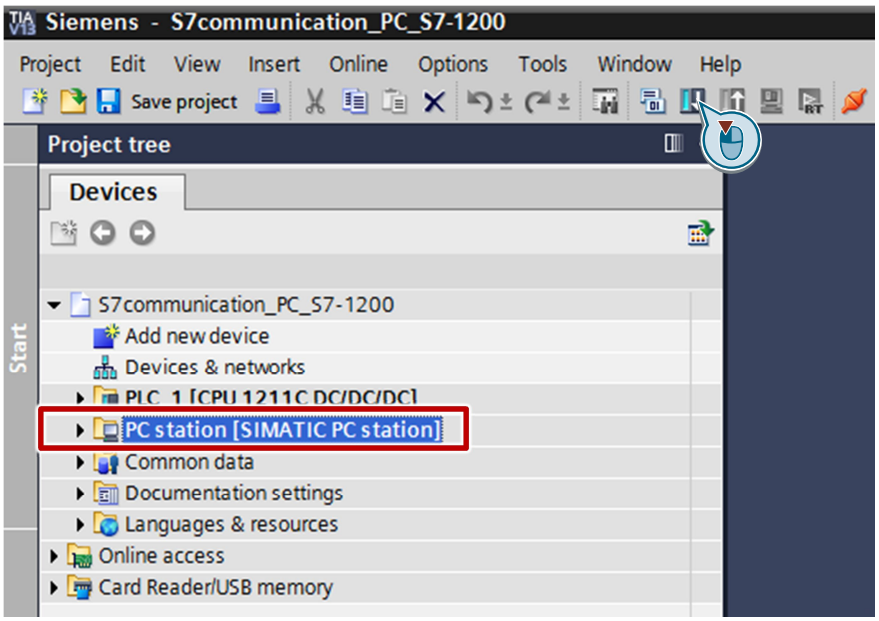
Table 3-3

No.	Description
1.	In the Project tree you mark the device folder of the PC station. In the toolbar you click the "Compile" button. The hardware configuration and the software of the PC station are compiled. 
2.	In the Project tree you mark the device folder of the PC station. In the toolbar you click the "Download to device" button to download the project to the Station Configuration Editor. The "Extended download to device" or "Load preview" dialog opens automatically. 

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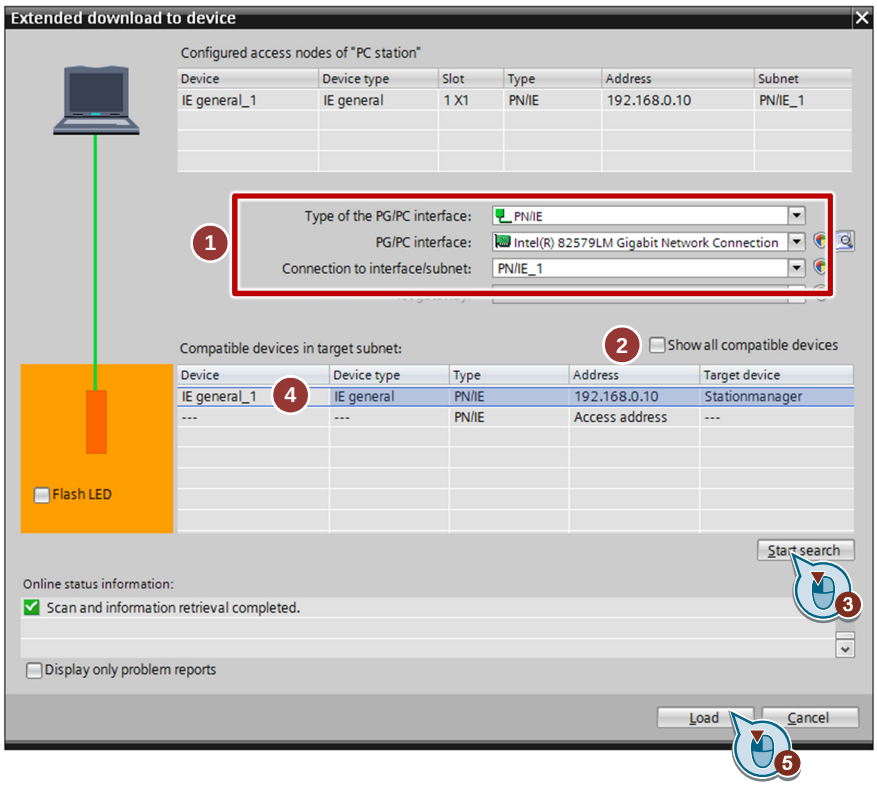
No.	Description
3.	The "Extended download to device" dialog opens automatically only if the access path from the PG/PC to the PC station has to be set. 1. Make the following settings: - Type of the PG/PC interface: PN/IE - PG/PC interface: Network card of the PG/PC - Connection to interface/subnet: Subnet of the PC station, PN/IE_1, for example 2. Disable the "Show all compatible devices" option. 3. Click the "Start search" button. The network card of the PC station is displayed in the "Compatible devices in target subnet:" list. 4. From the "Compatible devices in target subnet:" list you select the network card of the PC station. 5. Click the "Load" button. 

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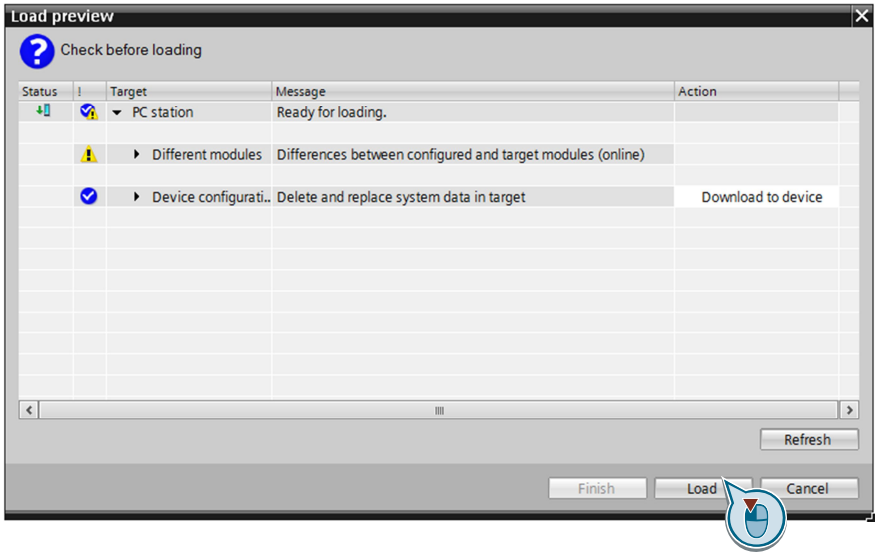
No.	Description
4.	In the "Load preview" dialog you click the "Load" button to start the download procedure. 
5.	Commissioning of the PC station is completed after downloading of the configuration.

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3.6 OPC Scout V10

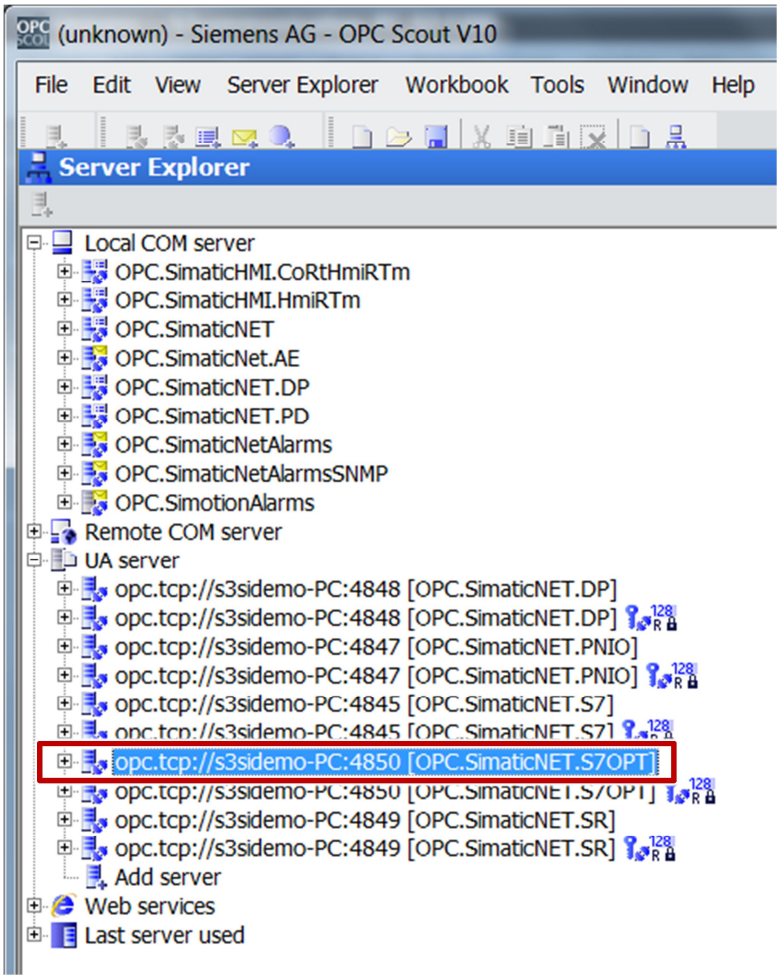
In this example the OPC Scout V10 is used as the OPC client. Using the OPC client you can access the data of the S7-1200 CPU via the OPC server.

Start the OPC Scout V10 by means of the Windows menu "Start > All Programs > Siemens Automation > SIMATIC > SIMATIC NET > OPC Scout V10".

3.6.1 Establish Connection to the OPC Server

Start the UA server: opc.tcp://s3sidemo-PC:4850 [OPC.Simatic NET.S7OPT].

Figure 3-33



3.6.2 Symbolic Access

The symbols configured in the STEP 7 configuration (see section 3.2) are displayed in the Server Explorer under "UA Server > opc.tcp://s3sidemo-PC:4850 [OPC.SimaticNET.S7OPT] > Objects > SYM: > S7-1200 Station_1 > PLC_1".

In this example we use the symbol table of the S7-1200 CPU, because an S7 connection to this CPU is configured for the OPC server. Here the symbols of the symbol table which refer to the data blocks (DB), markers, inputs and outputs, for example, are taken into account.

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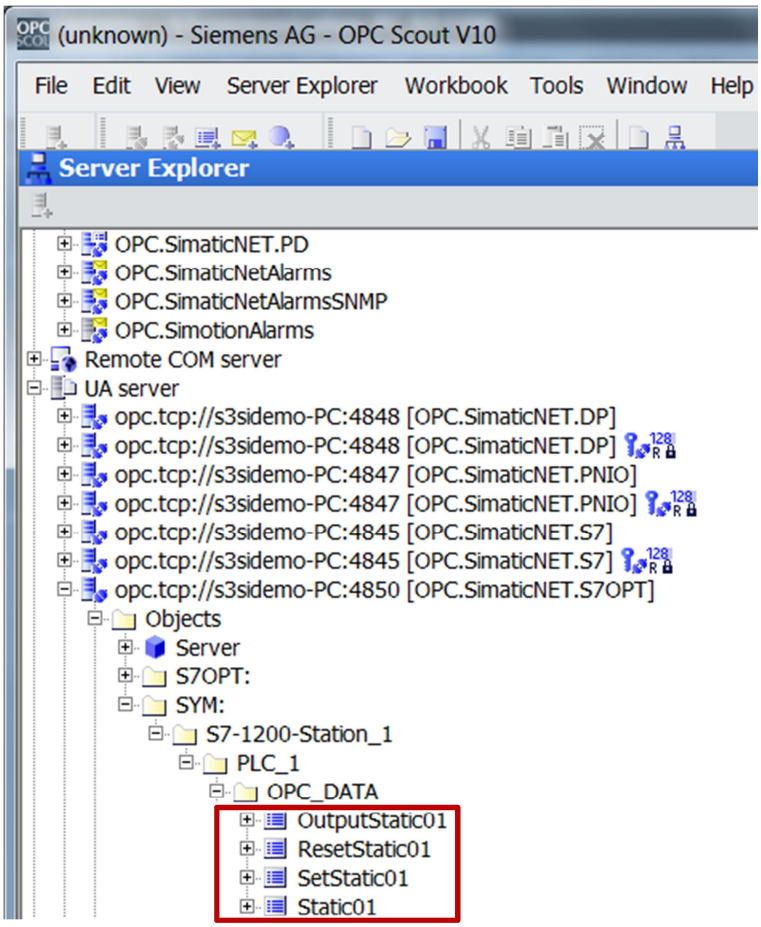
Figure 3-34



Create OPC items

Add the OPC items below to the DA view.

Table 3-4

OPC item	Description
SYM: S7-1200 station_1.PLC_1.OPC_DATA.Static01	Via the OPC item you monitor the "Static01" tag in the data block DB1 "DATA"
SYM: S7-1200 station_1.PLC_1.OPC_DATA.SetStatic01	Via the OPC item you monitor and control the "SetStatic01" tag in the data block DB1 "DATA"
SYM: S7-1200 station_1.PLC_1.OPC_DATA.ResetStatic01	Via the OPC item you monitor and control the "ResetStatic01" tag in the data block DB1 "DATA"

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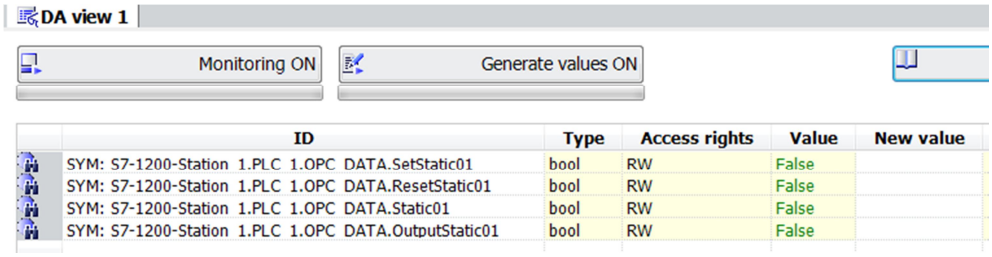
OPC item	Description
SYM: S7-1200 station_1.PLC_1.OPC_DATA.OutputStatic01	Via the OPC item you monitor the "OutputStatic01" tag in the data block DB1 "DATA"

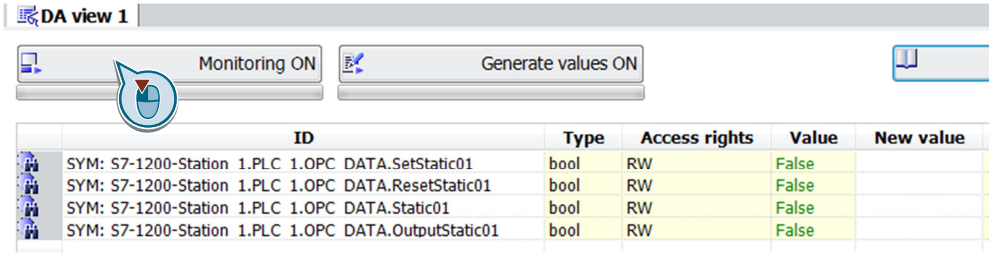
Figure 3-35



Monitor OPC items

Click the "Monitoring ON" button to monitor values of the OPC items. The values of the OPC items are displayed in the "Value" column.

Figure 3-36



Write values

1. In the "New value" column you enter the value that you want to write to the S7-1200 CPU. Enter the values below in the "New value" column (see Table 3-5).

Table 3-5

OPC item	New value
SYM: S7-1200 station_1.PLC_1.OPC_DATA.SetStatic01	True
SYM: S7-1200 station_1.PLC_1.OPC_DATA.ResetStatic01	False

2. Click the "Write" button.
3. The OPC items "SYM: S7-1200 Station_1.PLC_1.OPC_DATA.Static01" and "SYM: S7-1200 Station_1.PLC_1.OPC_DATA.OutputStatic01" are set to the value "true". The results of the write procedure are displayed in the "Value" column.

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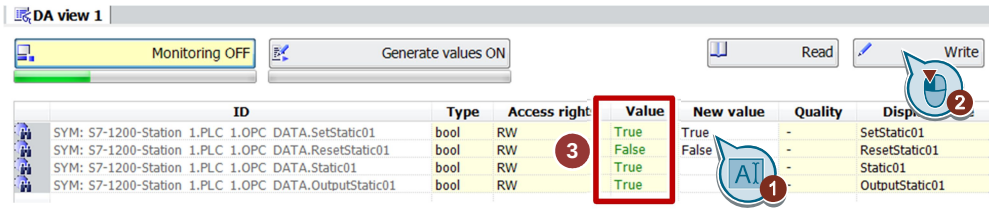
Figure 3-37



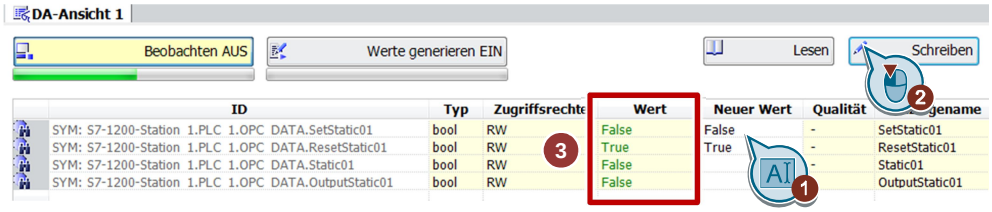
1. Enter the values below in the "New value" column (see Table 3-6).

Table 3-6

OPC item	New value
SYM: S7-1200 station_1.PLC_1.OPC_DATA.SetStatic01	False
SYM: S7-1200 station_1.PLC_1.OPC_DATA.ResetStatic01	True

2. Click the "Write" button.
3. The OPC items "SYM: S7-1200 Station_1.PLC_1.OPC_DATA.Static01" and "SYM: S7-1200 Station_1.PLC_1.OPC_DATA.OutputStatic01" are reset to the value "false". The results of the write procedure are displayed in the "Value" column.

Figure 3-38



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